

At 1 mile, 4 furlongs, 109 yards, the aneroid reads 28.24; then we descend again; then another rise; then down and up again. On the last summit (at 2 miles 57 yards) the aneroid reads 28.23. After that we go down once more and cross the *Kurudádodi nullah*, 10 feet by 3 feet; at 2 miles, 1 furlong, 165 yards. Then ascend again. From here a track branches off to the right to Kósampur; there is some rock about.

At 3 miles, 2 furlongs, another summit is reached where the aneroid reads 28.19, showing a total rise from Háthgáon of 200 feet; from here the track leads steadily downwards. The jungle consists of tall matti and sál trees.

At 3 miles, 6 furlongs, the Mongosáriah (or Golária) nullah is met (25 feet by 5 feet) where the aneroid reads 28.27, showing a rise from Háthgáon of only 100 feet in 3½ miles. This is the nullah along the banks of which the trace should be taken down to the Soroá river (*vide* notes on the 27th, at 5 miles 1 furlong).

From here begins another gentle ascent, and then come a few slight undulations with two swampy glades draining to the left into the Golaria; until at 5 miles 4 furlongs we arrive finally on the Jeypore plateau, and the flat country stretches far away to the south. Met 300 pack-bullocks, taking salt from Sálur to Raipur.—At the edge of the plateau (aneroid 28.16) there is some dense, young sál jungle, with a thick undergrowth of stunted dates and other bushes and tall grass, the whole forming a tangle almost impenetrable. Then begins a long swampy glade, partly cultivated, about half a mile wide, and extending southwards for miles, bordered with sál jungle east and west; the Poragora hills looming in the distance, where there is said to be good black-wood timber and iron stone.

6th mile. *Village of Kúruberra*. Aneriod 28.16. Soil, dark clay.—We are now in the campaign country of Jeypur.

7 miles, 3 furlongs. Kóliapodór, with twenty houses and about 100 inhabitants. The homesteads have large compounds enclosed by fences of upright stakes; there are some vegetable gardens. The people here speak Ooriya. The track leads along the eastern edge of the great swampy glade, through low scrub jungle and young sál.

At 8 miles, 6 furlongs, where the aneroid reads 28.18, the swamp is crossed; the country continues flat, while swamp and jungle occur alternately along the track. The soil gradually becomes lighter and harder as we get away from the large swamp.

At 11 miles, 100 yards, Raigarh; with a fine mango tope, good encamping ground and the remains of an old mud fort. Here are about 40 houses, containing 150 people; all Hindus, no Mussulmans or Ghóuds.

The detached aneriod reads 28.16; while the mean reading of the battery is 27.98. Height above mean sea level 2,101 feet. Rise from Háthgáon 231 feet. Distance of Raigarh from Raipur 124 miles.

The Manager of the Bindra-Noagarh estate, who had accompanied the party up to this and made himself very useful, returned from here.

The Amin of Omorkót was here to look after supplies, &c.

Halted at Raigarh on the 29th.

January 30th. Raigarh to Béra. Distance, 11 miles 4 furlongs. Thermometer 6 A.M., 55° F.; 11 A.M., 81°; 4 P.M., 83°.

Near the village a tank bund is crossed or rather a dammed-up swamp; then begins the jungle again. There is a well trodden track; the soil is hard brown loam, with laterite cropping out in places; also some gneiss rock. Then jungle and swamp, the latter cultivated in places, alternate. The jungle is chiefly sál; some of the swamps must be nearly impassable in the rainy season.

At 3 miles, 2 furlongs, the site of Kamli, now deserted. The villagers are stated to have moved to another spot on account of the Brinjarri traffic along the track troubling them. Here is a tank which is said to be never dry, and a temple to the goddess Mátá. There is a large swamp near, which has been cultivated. Then jungle again, young sál and scrub.

In the 5th mile we pass into a fine forest of old and young trees, chiefly matti and sál, with some black-wood and yégi, and very little underwood. The forest continues for miles, interrupted here and there by grassy glades, which are swampy in the rains. The soil is fertile and the lay of the ground easy for a road. The track leads for several miles through beautiful forest over level ground, on a water-shed and encounters very little drainage. Here is some of the finest forest I have seen on this expedition; it has apparently never been touched by the hand of man and might be called primeval.

In the 7th mile the ground is slightly undulating: the soil in the lower parts is rich, dark clay; on the higher ground light brown and sandy.

In the 10th mile the ground descends gently towards Béra; the soil is sandy loam. At 10 miles, 4 furlongs, we emerge from the great forest and enter small jungle. At 10 miles, 5 furlongs is a large clearing where the village of Béra formerly was.

The people are said to have shifted to another site, not far from this, some years ago, when the Police was first introduced here. There are extensive rice fields; a ledge of gneiss rock shows above the surface in two places.

11 miles, 4 furlongs. Béra has about 15 huts and 40 inhabitants. It is situated near the Tél Nadi, which is here 40 feet wide and 8 feet deep between the steep and soft banks, subject to floods which inundate the swamp on both sides. The drainage encountered on this day's march was very little, as the track led for the most part along the ridge of a low watershed, from which the country falls away in scarcely perceptible slopes to the right and left.

All glades and swamps, along which the drainage runs, will of course require embankments, with culverts or small bridges. There is a good encamping ground on the old site of Béra, and a smaller one on the bank of the Tél Nadi, in a loop formed by the river, by the side of the track.

The mean reading of the aneroid battery at Béra is 28·15.

Height above mean sea level 1,967 feet. Fall from Raigarh 134 feet. Distance of Béra from Raipur 135 miles, 4 furlongs.

*January 31st. Béra to Omorkót.* Distance 7 miles, 4 furlongs. Thermometer 6 A.M., 48°; 11 A.M., 77°; 4 P.M., 81°. In the first furlong the Tél Nadi is crossed, 40 feet by 8 feet between the banks, which are subject to floods, for some distance, to a further depth of at least 3 feet. Then jungle and high grass; some rising ground; a drainage channel flowing to the left, about 4 feet by 2 feet. At the 5th furlong is the summit of the rising ground, about 12 feet above the starting point; then two small nullahs, 5 feet by 3 feet.

*Stately primeval forest* of grand old trees; dead trunks are lying about where they fell years ago, some quite decayed, apparently never touched by man. Ground slightly undulating. At 2 miles, 2 furlongs, a glade draining to the left. Embankment required, with a culvert, 6 feet by 3 feet.

*3 miles, 1 furlong. Burja;* two small villages containing together about 50 houses and 150 people. The large farm yards are fenced in with palisades as a protection. South of the village common jungle again: no longer the fine old forest.

*At 3 miles, 5 furlongs, a large swamp,* more than a square mile in area; partly bunded up and converted into a tank, with extensive fields under it belonging to Burja. The tank might be improved and irrigation extended. From this swamp flows a nullah called Bakuli. Then thin scrub jungle, on light sandy loam. At the 4th mile another swamp and a clearing in the jungle; then low scrub jungle again.

*5 miles, 3 furlongs;* a clearing and swamp; then light jungle with some fields; then a ploughed swamp. It is mostly good, rich soil between Béra and Omorkót, classed as No. 1 by the Revenue Surveyors.

*7 miles, 3 furlongs. Bhaskel nullah.* Steep banks; hard bed; no rock; 40 feet wide between the banks, which are 8 feet high and covered during great floods to a further depth of 3 feet, for some distance.

*7 miles, 4 furlongs. Omorkót,* a considerable village with a Police station, and the headquarters of an Amin. Here I met Mr. Cormac who had marched from Raipur *via* Dhamtari and Kankér. His own report on his reconnaissance accompanies these notes.

Mean reading of aneroid battery 28·12. Height above mean sea level 2,021 feet. Rise from Béra 54 feet.

Distance of Omorkót from Raipur *via* Rajim and Háthgáon 143 miles;\* *via* Dhamtari and Kankér, 150 miles. Good camping ground in tope; good water from the Bhaskel nullah. Halted at Omorkót on the 1st February.

*February 2nd. Omorkot to Bijepur.*—Distance 12 miles, 4 furlongs. Thermometer 6 A.M., 52°; 11 A.M., 86°; 4 P.M., 79°. The track enters the jungle at once; there is some rock; the soil is light sandy loam. In the 2nd mile the village of Dongrigura; with a small irrigation channel called Júnapáni.

At the 3rd mile a swamp with some cultivation; rich, dark soil all around.

*4 miles, 1 furlong, the village of Sána Borondi;* then across a swamp, past a newly planted mango tope. Then a tank near the village of Bóro Borondi.

*5 miles, 1 furlong. Bóro Borondi,* with some vegetable gardens, and a wooden temple (*i. e.*, merely a rude framework) to the goddess Bhima (Káli?).

There is also a sacred swing, with numerous sharp nails driven through the seat from below; on these nails good and holy persons are said to be able to sit without injury, and some do so at great festivals. But none of my people would try it.

*6 miles, 3 furlongs, 124 yards. Nági river;* steep banks and gravelly bed; no rock; 80 feet wide and 15 feet deep. This river should be bridged a mile to the east of the present track, to avoid crossing twice as the track does. Some laterite cropping out here.

*7th mile, Dodra village.* Fine tope and two tanks. Extensive rice fields. Numerous cattle. Then light jungle and clearings alternately.

*9 miles, 4 furlongs, village of Tétaguón.* Then a swamp. Further on, the ground is gently undulating.

*10th mile. The village of Bokra* to the right. Scrub jungle; another swamp. Then small sál jungle.

*11 miles, 6 furlongs. Chatagura village.* Then some low swampy ground.

*11 miles, 8 furlongs;* cross the Chatringi river, 45 feet by 12 feet; in soft sandy soil. Then a swamp again.

*12 miles, 4 furlongs. Bijepur,* with a splendid old tope of different kinds of trees, but chiefly mango and fig. The village is very insignificant now, but Bijepur is said to have been once a great place and the residence of a Rajah.

Mean reading of aneroid battery 28·14. Height above mean sea level 1,955 feet.

Fall from Omorkót 66 feet.

Distance of Bijepur from Raipur 155 miles, 5 furlongs.

\* NOTE.—By avoiding Neagarh and keeping along the Sondor river this distance is reduced to 137 miles.

*February 3rd. Bijepur to Dabgaon*—Distance 10 miles, 6 furlongs. Thermometer 6 A.M., 52°; 11 A.M., 75°; 4 P.M., 77°.—We enter sâl jungle; at 1 mile, 4 furlongs cross a swamp; then sâl jungle again, with occasional glades, each glade or swamp requiring an embankment and one or more culverts. The soil varies from dark, stiff clay to light, sandy loam; with red soil and gravel here and there.

*In the 4th mile a large swamp*, partly bounded up for cultivation.

4 miles, 2 furlongs; passed village of Nakjor.

At 5 miles, 2 furlongs; a swamp, with a drainage requiring a culvert 9 feet by 4 feet.—All small sâl jungle.

6 miles, 3 furlongs. *Belari nullah*, 35 feet by 15 feet. Steep soft banks; sandy bed; no rock.

7 miles, 4 furlongs. *A swamp* about 100 yards across. From here a path is cleared through the jungle 8 to 10 yards wide; the surface has been smoothed, and side drains cut. Fine sâl forest again. Then some undulating ground, where cuttings and embankments will be wanted; but nothing on a large scale. A nullah 9 feet by 3 feet.

8 miles, 7 furlongs, a swamp, with soft black mud. Then jungle again, soil, sandy loam.

9 miles, 4 furlongs, a deep swamp, where a considerable embankment and a bridge, 20 feet by 10 feet, will be wanted to let the drainage pass through.

10 miles, 6 furlongs. *Dabgaon*, with 30 houses and 100 inhabitants; a police station. Good encamping ground in a mango tope. Water fair.

Mean reading of aneroid battery 28.12.

Height above mean sea level 1,983 feet, rise from Bijepur 28 feet.

Distance of Dabgaon from Raipur, 166 miles, 3 furlongs.

*February 4th. Dabgaon to Páparhandi*.—Distance 11 miles. Thermometer 6 A.M., 51°; 11 A.M., 75°; 4 P.M., 77°.

3 furlongs, 106 yards. *Ongi nullah*, 60 feet by 14 feet, both banks subject to flooding; sandy sides and bed; no rock. A rude foot-bridge, well above high water, has been provided for this and some other large nullahs.—All jungle.

2nd mile. *Village of Moideri*, on somewhat irregular ground; large rice fields. Other crops: gram, ragi, mustard, castor, tobacco, and garden vegetables.

Then a swamp requiring an embankment with a culvert, 10 feet by 4 feet. Fine sâl forest again.

3rd mile, a drain, 5 feet by 3 feet required.

4th mile, some undulating ground.

5 miles, 2 furlongs. *Barigura village*. Then jungle again.

6 miles, 6 furlongs. *Jelabhal village*. Then a swamp.

7 miles, 1 furlong. *Basni nullah*, 90 feet wide and 12 feet deep; sandy bed; ill defined, soft banks; no rock.

A temporary foot-bridge is laid from bank to bank. In the 8th mile, a swamp; drain 10 feet by 5 feet required. Then some rising ground. All sâl jungle. Good medium soil, classed as No. 2 by the Revenue Surveyors.

10 miles, 6 furlongs. *Turi nullah*, 90 feet wide 12 feet deep. Sandy bed; low, soft banks, flooded; no rock. Then cross a swamp 400 yards wide.

11 miles. *Páparhandi*.—About 100 houses and 400 people. Fine tope for camping; good water from Túri nullah. Magnificent old banyan trees, with far-spreading branches supported by numerous root pillars. An old fort overgrown with jungle. A fine temple of Siva, built of stone resembling Chunâr sandstone. A fair is held here weekly. There are some sugar-mills at work. The Sub-Magistrate of Nárangpur came here to meet the party.

Mean reading of aneroid battery 28.21.

Height above mean sea level 1,922 feet.

Fall from Dabgaon 61 feet.

Distance of Páparhandi from Raipur 177 miles, 3 furlongs.

*February 5th. Paparhandi to Nárangpur*. Distance 8 miles, 193 yards. Thermometer 6 A.M., 52°; 11 A.M., 72°; 4 P.M., 78°.—From Páparhandi I detached a small party this morning to go up the valley of the Indrâbati, and then up the Golagad river to Maribata, to ascertain by the aneroid the height of the saddle between the sources of the Golagad and Ryaguddah rivers; as this valley would seem to offer a favorable line for connecting Ryaguddah with Páparhandi and for ascending the Jeypur plateau from the former place by an easy ghât.

The long-promised Revenue Subordinate, in the person of N. Pâni Grâhi, Head Clerk Special Assistant Agent's Office, Kuraputi, joined the party here at last.

The track leads through fine tree jungle, and then crosses a swamp, where a masonry drain 10 feet by 5 feet is required. After that the ground rises slightly and the soil becomes red. 1 mile 4 furlongs, another swamp; drain 10 feet by 5 feet required. Another stretch of jungle on rising ground, and then a swamp again. Then a long gentle rise, and then descent to swamp.

2 miles, 6 furlongs, a long winding swamp cultivated. Scrub jungle all round.

3rd mile. *Gantat River*, 60 feet by 14 feet; soft bed and banks. In the 4th mile a swamp, with rising ground and jungle on both sides; a similar one in the 5th, and another in the 6th mile.

7th mile. Village of *Májigura*, with a good mango tope. Some laterite. From here a fine avenue, consisting of a treble row of mango trees, about fifty years old, leads to *Nárangpur*.

8 miles, 193 yards. *Nárangpur*, with a Sub-Magistrate's Court, a Mulki Post Office, and a Police Station; the *Jeypur* Rajah's Amín also lives here, who politely came out on an elephant some miles to meet me. *Nárangpur* contains some 650 houses, with from 3,000 to 4,000 inhabitants. It has four tanks and some fine topes. There are carpenters, blacksmiths, and weavers here. Tasser silk is made, also lacqueredware and glass bangles.

The mean aneroid reading is 28.24.

Height above mean sea level 1,918 feet.

Fall from *Páparhandi* 4 feet.

Distance of *Nárangpur* from *Raipur* via *Rajim* and *Háthgáon* 185 miles, 4 furlongs.

The *Jeypur* Rajah's Dewán at *Nárangpur* was very obliging, and afforded all necessary assistance to the party.

NÁRANGPUR,  
10th February 1882.

K. F. NORDMANN,  
Executive Engineer, on Special Duty.

NOTE.—The heights, which had been originally only approximately calculated, i. e., without reference to the aneroid readings at the sea-coast, have now been corrected by means of the latter, and are correct.—K.F.N.

## XV.

### B.

Extract from Executive Engineer's Notes of Reconnaissance from *Nárangpur* to *Kuraputi* via *Boriguma* and the old *Madeoputi* Ghát, 38 miles. February 13th to 16th, 1882.

February 13th. *Nárangpur* to *Porli*.—Distance 8 miles, 5 furlongs. Thermometer 6 A.M.,

Height of *Nárangpur* above M.S.L. 61°; 11 A.M., 83°; 4 P.M. 85°.—After passing southwards 1,918 feet. through the town of *Nárangpur*, extensive rice-fields were crossed; then some jungle, consisting chiefly of mango trees; then another expanse of paddy flats.

In the 1st mile is *Barabukli*, a small village.

At 1 mile, 4 furlongs, a *nullah*, 25 feet by 8 feet, with muddy banks and bed. The prevailing soil is reddish loam, and there is some laterite showing above the surface. At 1 mile, 5 furlongs, the northern bank of the *Indrábati* is reached; the bank is soft and steep, the bed sandy. There was from 2 to 3 feet of water in the river, which has a lively current. The water to be crossed was 220 feet wide, while the river in flood is 465 feet wide and 24 feet deep in the deepest part; the highest floods, which overtop the banks, are said to add 4 feet more to that depth. A ferry is here, consisting of a platform resting on three canoes. Then follows some light jungle with patches of dry cultivation, Bengal-gram, dholl, tobacco, &c.; then more rice-fields. Soil sandy loam. A *nullah*, 10 feet by 6 feet; then paddy-fields. The soil on the higher ground is brown clay.

In the 3rd mile jungle again; the ground rises; prevailing soil laterite gravel.

At 3 miles, 5 furlongs, the summit of the rising ground is reached; after that there is a gentle slope down to a rice flat at the 4th mile. From here the ground continues level for some distance; another swamp is crossed at 4 miles, 6 furlongs; then comes a short rise; the jungle continues.

At 5 miles, 3 furlongs, we are again on a summit, about 50 feet above the last swamp. The jungle here consists of small scrub; soil red gravel. At the 6th mile a small water-course 7 feet by 3 feet, is crossed. Then a descent to a narrow swamp, and rising ground again on the other side; jungle continues.

At 6 miles, 6 furlongs, the track once more reaches a summit, this time on the shoulder of a small hill. The soil here is brown clay, the jungle light. Then begins a descent. Near the 8th mile the track crosses a paddy flat.

At 8 miles, 5 furlongs, the village of *Porli* is reached, containing about 30 houses and 120 people. Paddy and several kinds of gram, besides garden produce, are cultivated here. There is a good encamping site, well shaded, on the high ground north of the swamp adjoining the village; but the drinking water is of indifferent quality.

Mean reading of aneroid battery at *Porli* 28.18.

Height above M.S.L. 1,873 feet.

Fall from *Nárangpur* 45 feet.

Distance of *Porli* from *Raipur* 194 miles, 2 furlongs.

February 14th. *Porli* to *Pupogáon*. Distance 8 miles, 6 furlongs. Thermometer 6 A.M., 62°; 11 A.M., 84°; 4 P.M. 87°.—Marched over a cultivated swamp, through which a stream flows, 30 feet by 10 feet, with steep soft banks; then over rising ground, after which jungle and swamp occur alternately. The soil on the higher grounds is sandy loam; in the swamps stiff, dark clay.

In the 2nd mile some undulating ground; a long glade to the left, extending north and south, and indicating the direction of the future railway.

2 miles, 2 furlongs. Village of *Kondra*, with a fine mango tope and wet fields.

3 miles, 1 furlong. *Jilimili*, with a tope.

4th mile. *Boriguma*, with upwards of 100 houses; a travellers' bungalow built of mud walls, with a thatched roof. There is a *temple* with some old tanks about a mile west of *Boriguma* near *Gondaguda*. The temple is dedicated to Pátálesworo (Siva), and contains some very ancient carvings, amongst them a figure of *Bhoirawan*, the husband of *Káli*. It is said that a large town stood here in remote times.

4 miles, 6 furlongs. Village of *Dulaguda*.—Beyond, swamp and jungle. Soil heavy clay. Then a small ascent, followed by a fall of the ground, and a narrow swamp.

At 5 miles, 6 furlongs, the foot of another gentle ascent; then some undulating ground.

7 miles, 1 furlong; on the summit of the sloping ground, near *Satrela* village, a tope. Then down to a swamp, and up-rising ground again beyond. This is the general character of the country about here: low ridges with easy slopes clad with jungle and forest, alternating with swampy flats partly cultivated.

8 miles, 6 furlongs. *Pupogáon*, a middle-sized village. There is much quartz about here. Fine encamping ground on a high site west of the road, but the water obtained from the tanks is indifferent. Wells could easily be dug in the lower ground, where the water is not far below the surface.

Mean reading of aneroid battery 28.09.

Height above M.S.L. 1,981 feet.

Rise from *Porli* 108 feet.

Distance of *Pupogáon* from *Raipur* 203 miles.

February 15th. *Pupogáon* to *Ránigar*. Distance 7 miles. Thermometer 6 A.M., 65°; 11 A.M., 80°; 4 P.M., 86°.—The road leads through light jungle, over stiff brown clay; ground slightly rising.

At 1 mile, the summit of the ascent is reached, about 40 feet above the starting point. There are patches of dry cultivation, chiefly red and black gram, in the jungle. Then comes a downward slope, and at the foot of it a small swamp converted into fields. Thence rise again.

In the 2nd mile is the village of *Kunárpút*, with some wet and dry fields, and many *Mhówa* trees around. The *kenda* tree (Telegu, *tumica*) is found here, on the fruit of which mixed with honey and a kind of white clay the poorer *Oriya* people live to a great extent in the hot weather when they have nothing else to eat.

Further on the village of *Kebbedy*; with gardens containing *dholl*, the castor plant *cholum*, tobacco, *brinjals*, plantains, &c.

From here the road descends to the *Telingiri* river at 2 miles 6 furlongs. The water at present is from a foot to 18 inches in depth and 90 feet wide, but during floods it is 160 feet wide and 12 feet deep. The banks are of soft clay, alternately high and low; the bed is sandy, but firm.

Near this is *Chept-amb*, an old village-site, where a weekly fair is held, although there is no village now.

South of the river are rice-fields on high sloping ground, not irrigated except by the rainfall direct. *Mhówa* trees abound in this part.

At 4 miles, 3 furlongs; *Bóripút*, with some date palms and fields of gram, *dholl*, *ragi*, paddy, wheat and flax.

*Iron* is made at *Nawa Bóripút*, not far from here; but no limestone has yet been found. Soil, dark brown clay. Hills on both sides of the road.

*Traffic*.—In two hours this morning I met upwards of a thousand pack bullocks, some carrying salt from *Sálúr* to *Chattisgarh*; others rice, wheat, and Bengal-gram from the latter to the former place; again, others going empty to *Kotpad* to buy rice there and sell it at *Sálúr*. One gang was returning empty *via* *Kankér* to *Raipur*; they had been engaged in taking rice from *Kotpad* to *Sálúr*.

The ground now becomes irregular and in parts rocky; the road is cut out of the hill-side; and I saw coolies at road repairs, the first thing of the kind since leaving *Raipur*.

At 6 miles, 1 furlong, a nullah, 15 feet by 6 feet, is crossed, which flows into the *Telingiri* river. There is hilly jungle all around.

At 7 miles, *Ránigar*, a small village of five or six huts, on the high northern bank of the *Telingiri* river. Soil red clay.

Mean reading of aneroid battery 28.04.

Height above M.S.L. 2,017 feet.

Rise from *Pupogáon* 36 feet.

Distance of *Ránigar* from *Raipur* 210 miles.

From *Pupogáon* I despatched Mr. Cormac's party to *Jeypur* to examine the intervening country and the ghât leading from *Jeypur* to *Kuraputi*; his report accompanies these papers.

I marched to *Ránigar* and thence up the old *Mádeoputi* Ghât, which seems to offer fewer obstacles and easier gradients for a railway than other lines. But the railway should not follow the old ghât too closely, especially in its lower course; the line should rather be taken entirely along the adjoining valley of the *Kuradi* nullah, which offers the most gradual ascent of all available lines.

*February 16th. Ránigar viā Mádeoputi to Kuraputi.*—Distance 13 miles 4 furlongs. Thermometer 6 A.M., 63°; 11 A.M., 87°; 4 P.M., 80°.—The road crosses the Telingiri river again, which is here 150 feet wide and 12 feet deep in flood, with soft high banks and hard sandy bed. There is rock 200 yards higher up. The low water at present is only a foot in depth and 70 feet wide. The railway would not cross here, but keep on the right bank and go up to Palkam, cross the Telingiri above its junction with the Kuradi, and thence up the latter to Kendra, Giliput and Mádeoputi.

The old ghāt is sometimes cut into the hill-side, sometimes it goes along a piece of flat ground on the high river bank; in other places straight up a steep incline. There is jungle the greater part of the way. A number of small hill streams cross the road.

At 1 mile from Ránigar the roads bifurcate, the new one on the right going to Kuraputi, the old track on the left to Mádeoputi. A good deal of traffic still passes by this ghāt, although the greater part goes up the new road to Kuraputi.

Near the village of *Dakra* the track crosses the Telingiri river again. The ground is uneven, the hill-side stony; there is good jungle with fine sál and matti trees. In the first 2½ miles the ascent is 80 feet. The village of *Músaput* is passed, and then the Telingiri is crossed again at 2 miles 6 furlongs. The hill-sides are partly cultivated, chiefly with castor. The *bandána* tree grows here, with fine purple flowers. The wood, which is very tough, is used for ploughs, yokes, and buildings.

*4 miles, 2 furlongs. Village of Bandakatra.*—Ten houses, with gardens containing mango and jack trees, plantains, &c.; in the fields are gram, dry paddy, gingelly, tobacco, flax, and castor. The total ascent up to this is 130 feet, *i.e.*, at the rate of 30 feet per mile. After passing Bandakatra the track leaves the valley of the Telingiri and, leading up a steep ascent, crosses over into the Kuradi valley.

At 5 miles, 4 furlongs, the total ascent amounts to 270 feet, *i.e.*, at the rate of about 50 feet per mile from Ránigar.

*5 miles, 7 furlongs. Village of Panasput.*—The total ascent up to this is 330 feet.

At the 6th mile is a tank for drinking water, about 150 feet square. Soil red sandy loam, with gravel here and there.

At 6 miles, 6 furlongs, a mango grove.

*7 miles, 4 furlongs. Mádeoputi*, with 30 houses, tamarined and mango topes. The rise from Ránigar to this is 450 feet, or about 53 feet per mile. We are now on the upper plateau; there is no jungle, but much dry cultivation.

*8 miles, 6 furlongs. Muchra village*, near the Kuradi stream. A mango tope. Rise from Mádeoputi 20 feet.

*9 miles, 7 furlongs. Village of Mastiput* on the bank of the Kuradi. Rise from Muchara 40 feet. From here the railway should continue to follow up the course of the Kuradi nullah towards Dumripur. The railway station for Kuraputi should be near *Dengagura*, 2½ miles east by north of Kuraputi, which latter is nearly 500 feet above Dengagura.

The mean reading of the aneroid battery at Mastiput is 27.61.

Height above M.S.L. 2,520 feet.

Rise from Ránigar 503 feet, or 50 per mile.

Distance of Mastiput from Raipur 220 miles.

From Mastiput I went across country *viā* Chinder to Kuraputi, a distance of 3½ miles. Total distance of Kuraputi from Raipur 223½ miles.\* Height above M.S.L. 2,900 feet. The aneroids in the battery being graduated only up to 27.50, do not show heights above 2,500 feet.

KURAPUTI,  
18th February 1882.

K. F. NORDMANN,  
Executive Engineer, on Special Duty.

The heights, which had been originally only approximately calculated, *i.e.*, without reference to the aneroid readings at the sea-coast, have now been corrected by means of the latter, and are correct.—K.F.N.

## XVI.

### C.

MR. COEMAC'S Diary of Reconnaissance from Raipur to Omarkot in Jeypur *viā* Dhamtari and Kankér, 16th to 31st January 1882. Distance 150½ miles.

*Raipur, 16th January 1882.*—Left camp at Raipur at 6 A.M., passing through the town along the main road, and emerged from it at a distance of 1 mile 180 yards from camp.

At 1 mile, 5 furlongs, 166 yards the Rajim road branches off to the east. Passed the rifle range of the Native Infantry Regiment stationed at Raipur and the village of Bhatagaon at 2 miles, 5 furlongs, 166 yards, and crossed a stream (20 feet by 6 feet) with sandy bed and well-defined banks of clay; stream is bridged.

At 3 miles, 4 furlongs 130 yards, passed the village of Boria Khoord; here there is a fine tank surrounded by two rows of large tamarind trees; cultivation now commences, there being a large area here under linseed and wheat.

\* NOTE.—By avoiding Noagarh and keeping along the Sondor river, the distance is reduced to 217½ miles.

At 5 miles, 3 furlongs, 200 yards, crossed a stream (24 feet by 8 feet) with clayey bed and ill-defined banks; the country all along is fully cultivated; soil black clay, full of holes and fissures.

At 7 miles, 1 furlong, crossed a stream (60 feet by 8 feet) with sandy bed and well-defined banks; up to this all streams are bridged.

At 8 miles, 5 furlongs, 96 yards, passed the village of Amdul, the land near which is all under linseed cultivation.

At 10 miles, 2 furlongs, 200 yards, there is a large well and a good camping ground, but no shade of any sort.

At 11 miles, 6 furlongs, 170 yards, crossed an unbridged nullah (50 feet by 9 feet) with sandy bed and well-defined banks; reaching camp near the village of Kolar at a distance of 11 miles, 7 furlongs, 71 yards, from Raipur, good drinking water procurable, but no good spot for camping.

*Kolar, 17th January 1882.* Distance from Raipur 11 miles, 7 furlongs.—Left Kolar at 6 A.M., passing through country fully cultivated, and crossed a stream (48 feet by 8 feet) at 1 mile, 1 furlong, 140 yards from camp. Passed the village of Khorpa at 1 mile 5 furlongs; Bhutgaon at 2 miles, 3 furlongs, 200 yards; Rakhi at 3 miles, 7 furlongs, 190 yards; and Kuchna at 6 miles, 2 furlongs, 170 yards. Country slightly undulating, and cultivated to the fullest extent; good topes near each village, and tanks in very good repair.

At 7 miles, 4 furlongs crossed a stream with sandy bed and well-defined banks (89 feet by 14 feet), and passed the village of Kanamuka, reaching camp at Silturra at 9-30 A.M.; distance from Kolar 9 miles, 2 furlongs. Camping ground not good; there are a few stunted acacia trees which give no shade; good water not procurable.

*Silturra, 18th January 1882.* Distance from Raipur 21 miles, 1 furlong.—Left Silturra at 6 A.M., passing through well-cultivated country.

At 1 mile, 5 furlongs, passed the villages of Singdehi on the east and Supela on the west; country nearly flat, and studded with small acacia trees.

At 2 miles, 7 furlongs, crossed a stream with sandy bed and well-defined banks (33 feet by 7 feet); some castor-oil tree cultivation on right bank.

At 4 miles, passed the village of Bhukara, with about 300 huts; a school-house and police station here; laterite rock surface of about 2 acres; on leaving passed a string of 41 camels going to Dhamtari for lac. Passed the village of Kusmura at 7 miles 4 furlongs, 110 yards, and reached camp at Gujra at 9-40 A.M.; distance from Silturra 8 miles 4 furlongs, 156 yards. Gujra is a small village of about 80 huts, and has four large tanks of water unfit, however, for drinking purposes; there is a small tope of recently planted mango trees; no good site for camping.

*Gujra, 19th January 1882.* Distance from Raipur 29 miles, 6 furlongs.—Left Gujra at 6 A.M., passing the village of Doma at a distance of 1 mile. Passed through country cultivated to the fullest possible extent, leaving the villages of Kurmatayre, Demar, Arjuni and Buthena, and reached the town of Dhamtari at a distance of 8 miles, 5 furlongs, 70 yards from Gujra; camp on the opposite side of the town at 9 miles, 7 furlongs, 125 yards; total distance from Raipur 39 miles, 4 furlongs, 138 yards. Dhamtari is a large town with about 5,000 houses and a population of 14,000 or thereabouts. There is a school-house, hospital, police station-house, and Tahsildar's Cutcherry; there are several large tanks and splendid mango and tamarind topes which surround the town, and some garden cultivation. Labor is available here to a large extent; hire as follows: coolies one and-a-half annas each (men); smiths, carpenters, and bricklayers at from three to five annas per day; good clay is procurable for bricks as well as limestone. The chief produce of the country is rice; wheat, linseed, several descriptions of gram and ragi are also cultivated and exported in considerable quantities; lac also forms a large item in the export trade, as I met 16 carts laden with it leaving Dhamtari. Tobacco, chillies, pumpkins, calabashes, brinjals and several other descriptions of vegetables are cultivated in gardens. The mango, custard-apple and bora fruit are procurable in the season; and plantains are to be had at all times, and are largely cultivated.

*Dhamtari, 21st January 1882.* Distance from Raipur 39 miles, 5 furlongs, 138 yards.—Left camp at Dhamtari at 6 A.M., through fine mango topes for half a mile; then through wet cultivation up to the village of Roodree, 2 miles, 115 yards from Dhamtari. After passing this village entered jungle with patches of cultivation here and there; the track here runs along the left bank of the Mahánadi, past the villages of Murradeo (3 miles, 5 furlongs, 70 yards) and Gangrel (5 miles, 4 furlongs, 120 yards), crossing this river at 6 miles, 3 furlongs, 57 yards, and reaching the village of Kokri at 7 miles, 2 furlongs, from Dhamtari. Near this village there is a large quantity of stratified gneiss rock cropping out, suitable for building purposes. The track continues up the valley of the Mahánadi (on the right bank) up to 8 miles, 4 furlongs, 68 yards, where it turns up the valley of the Dorki Naddi, which it crosses at 10 miles, 4 furlongs. The valley is about 2 miles in width, with an almost level cross section; on each side there is a low ridge of hills thickly wooded with good trees, principally ippa and matti, and a few teak trees.

At 11 miles, 1 furlong, 55 yards, passed the village of Lamkeni, round which there is a large area of cultivated land; soil sandy.

At 12 miles, 4 furlongs, 180 yards, reached camp at Dargahan where there is a police station-house. There are several good camping grounds near the village, and good drinking water is procurable from a well; distance from Raipur 52 miles, 2 furlongs, 98 yards.

*Dargahan, 22nd January 1882. Distance from Raipur 52 miles, 2 furlongs, 98 yards.—Left camp at Daraghan through wet cultivation until reaching the village of Sunghola at 7 furlongs distance. This village is situated on rocky ground, and has a good tank below it; there is some garden cultivation near the village, principally tobacco and castor-oil trees.*

At 1 mile, 4 furlongs, 58 yards, reached the village of Bhirawun, a small hamlet at the foot of some hills.

At 2 miles, 4 furlongs, 140 yards, passed the village of Mogragahan, round which there is a large area of wet cultivation and numbers of ippa trees. There is some sugarcane cultivation in the valley of a small stream crossed at 3 miles, 3 furlongs, 100 yards, and a sugarcane-mill at work; the ground is swampy at this place.

At 4 miles, entered the Kankér State near the village of Alva, which is fenced all round as a protection against wild animals. There is a little cultivation near the village in low-lying ground.

At 6 miles, 3 furlongs, 80 yards, entered light jungle, with plenty of good-sized ippa and matti trees; quartz and gneiss rock cropping up in all directions.

Reached the village of Charima on high ground at 7 miles, 5 furlongs, 80 yards, after crossing two streams; there is a little cultivation near the village, which stands in the midst of jungle; kunkur limestone is found near the village.

Reached camp near the village of Polawai at 10 miles, 2 furlongs, 84 yards; near the village is a large tank of fairly good water and a good camping ground; soil all along sandy red clay. Distance from Raipur 62 miles, 4 furlongs, 182 yards.

*Polawai, 23rd January 1882. Distance from Raipur 62 miles, 4 furlongs, 182 yards.—Left Camp at Polawai at 6-15 A.M. and passed through uncultivated country and some swampy land, reaching the village of Sawada at 7 furlongs and 156 yards. There are numbers of young mango trees planted near the village, and there is about 1 square mile of wet cultivation.*

At 1 mile, 4 furlongs, 70 yards, crossed a stream (40 feet by 7 feet) with clayey bed and banks; there is wet cultivation from this up to the village of Kurna, which is a collection of miserable mud hovels. Distance from Polawai 2 miles, 150 yards.

Reached the Mahánadi at 2 miles, 3 furlongs, 125 yards; there is no rock visible in the sandy bed of the river; the banks are clay and well defined. From this the country is uncultivated; ippa trees very plentiful.

Crossed the Makree River at 7 miles, 60 yards (150 feet by 12 feet); bed sandy, and well-defined, banks of clay; passed the village of Berawai at 7 miles, 2 furlongs, 190 yards, where there is some little cultivation.

Reached the town of Kankér at 9 miles, 7 furlongs, and crossed the Dúhd River at 10 miles 1 furlong; bed sandy, and banks of clay, well defined (115 feet by 8 feet); passed the Rajah's house and a temple on the west, and encamped beyond the town. Distance from Polawai 10 miles, 7 furlongs. Total distance from Raipur 73 miles, 4 furlongs.

The Rajah's house and the temple, which stand at the foot of a rocky hill, are built with brick in chunam; kunkur limestone is found here, but little or no labor is to be had, there being only two bricklayers, two smiths, and one carpenter in the town.

The chief produce of the country is rice; ragi, green-gram, horse-gram, Bengal-gram, black-gram, and dholi are also cultivated, and a very poor kind of plantain, as well as the usual country vegetables.

*Kankér 25th January 1882. Distance from Raipur 73 miles, 4 furlongs.—Left camp at Kankér at 6 A.M. through small jungle with thick undergrowth; this continued up to 2 miles, 7 furlongs, where the Hutkul River was crossed (167 feet by 15 feet); sandy bed and well-defined banks of clay. Observed much kunkur limestone near the crossing; beyond the river the ground is somewhat broken, and further on slightly undulating.*

At 3 miles, 6 furlongs, crossed a smaller stream (40 feet by 9 feet) with sandy bed and well-defined banks of clay.

At 4 miles, 210 yards, reached the village of Kongera, a small cluster of miserable huts and with about 6 acres of cultivated land near. There is a small area of garden cultivation consisting of tobacco and castor-oil trees.

Continued through dense jungle up to 5 miles, 6 furlongs, where the Amordergi river was crossed (40 feet x 10 feet); the banks of this stream above the crossing are well defined, the bed is sandy.

Traversed jungle till the village of Aravail was reached at 7 miles, 4 furlongs, 210 yards. There is a large area of sugarcane, tobacco, and plantain cultivation in the gardens, as also castor-oil trees; the clearing near the village is extensive. No sál trees were met with up to this, but beyond, this was almost the only description seen.

At 8 miles, 2 furlongs, 174 yards, crossed the Hatkul river again (117 feet x 14 feet); the higher up the stream, the bed and banks are rocky and the cross section somewhat less. The bed is sandy at the crossing, and one bank rocky, the other clay.

Crossed a small stream (10 feet x 6 feet) with rocky bed, and reached camp in a small clearing in the forest at 9 miles, 4 furlongs, 135 yards. There is an abundance of good timber here, chiefly sál. There is no good camping ground, but good water is obtainable from the Hatkul river, 1 furlong distant. Distance from Raipur 83 miles 147 yards.

*Camp in the forest near Salabat, 26th January 1882. Distance from Raipur 83 miles 147 yards.*—Started from camp at 6 A.M. to the Hatkul river, distance 1 furlong, 100 yards; Aneroid reading 28.80. passed up the valley in the bed of the stream, for 1 mile, then up the right bank to Chiprai; 2 miles from camp.

Continued up the course of the stream, sometimes on the right bank and sometimes on the left, and latterly through dense bamboo jungle, through which the sun could only be seen at intervals, to 7 miles 2 furlongs, at the junction of two large streams; passed some very large sized matti trees in the forest and also sál; from this place the guides desired to take me across to Chiklidi, but I decided to continue up the bed of the stream until I should reach the plateau, and proceeded accordingly. Up to this no obstacles were met with to hinder the construction of a first-class road or railway, the cross section of the ground being almost level. Here, however, some difficulties were encountered; the banks of the stream were precipitous; above, the hills came sloping down at an angle of 45°, and the jungle was impenetrable. I had therefore to move up the bed of the stream, frequently crawling over the rocks, which were as slippery as glass, on my hands and knees; the perambulator could not run over such rocks, and was therefore carried for about 2 miles, which occupied two hours to get over. There is much quartz rock in the bed of the river, of a pink color, and gneiss of various colours, black or nearly so, slate colored, and reddish; this last being studded with crude garnets.

At 9 miles (about) the junction of the small stream from Siduwan was reached, and a small path found, along which the perambulator was again started; Aneroid reading 28.40. and leaving the river bed, passed through sál jungle for 2 miles, 2 furlongs, 110 yards, when Siduwan was reached. This is a fairly large village, Aneroid reading 28.14. surrounded by a substantial fence of strong stakes, about 6 feet in height; there is a large clearing, and extensive wet cultivation near the village; the camping ground is not good, there being no shade; and good water is not procurable.

Total distance from Raipur 94 miles, 3 furlongs, (about).

*Siduwan, 27th January 1882. Distance from Raipur 94 miles, 3 furlongs (about).*—Left camp at 6 A.M. through dense sál jungle, with few trees of any size; thick undergrowth of date shrubs about three feet high.

At 2 miles, 4 furlongs, 82 yards, crossed a stream (30 feet x 7 feet) with well-defined banks of clay and sandy bed, and reached the village of Korgaon at 2 miles, 7 furlongs, 104 yards. There is a tolerably large clearing round the village; a small area of wet and some garden cultivation; soil sandy brown clay.

At 5 miles, 130 yards, reached the village of Kalgoan through sál jungle. There are large boulders of gneiss near the village; continued through sál jungle to the village of Kajran, where there is a large area of wet and garden cultivation: tobacco, plantains and some country vegetables.

Crossed the Baordhig river at 10 miles, 210 yards; bed sandy, banks clay, and well-defined.

Crossed another stream at 10 miles, 5 furlongs, 90 yards, and reached the village of Liagaon at 11 miles, 3 furlongs. This is the largest village passed since entering the Bustar State. There are a number of carts lying about the village. The area under wet cultivation is large, and there are several small gardens.

Crossed a large stream at 12 miles, 5 furlongs (82 feet x 18 feet) with sandy bed and well-defined banks of clay, and reached camp at Bansket, after crossing a swamp near the village, at 11.30 A.M.; distance 14 miles, 3 furlongs.

Bansket is a small village in a clearing in the jungle, and has but a small area of wet cultivation in the swamp close by.

*Bansket, 28th January 1882. Distance from Raipur 108 miles, 6 furlongs.*—Left camp at Bansket at 6 A.M., passing through sál jungle with small date shrub undergrowth.

Crossed swampy ground under paddy cultivation and entered the village of Dodra at 2 miles, 4 furlongs, 136 yards; a small village in a small clearing in the jungle.

At 4 miles, 2 furlongs, 110 yards, reached the village of Simora, a small village in a clearing in the jungle with some wet cultivation near.

Crossed a stream (22 feet x 12 feet) with well-defined banks of clay and sandy bed, and passed through the village of Tumda, the largest village passed this day. There is an extensive area of wet cultivation; and sugarcane, castor-oil trees, and plantains in gardens; two iron smelting furnaces at work in the village. Passed the small village of Kudi at 7 miles, 1 furlong in a small clearing in the jungle; and passing through some jungle entered a fine sál forest at 9 miles, 2 furlongs; this continued for about one mile; numbers of trees measuring 14 feet in girth, 4 feet above the ground. Reached camp at Paorbel, a small village in a clearing in the jungle; camping ground not good, and good water not procurable; distance 11 miles 160 yards.

*Paorbel, 29th January 1882. Distance from Raipur 119 miles, 6 furlongs, 207 yards.*—Left Paorbel at 6 A.M. through dense sál jungle with but few trees of any size.

At 1 mile, 1 furlong, 180 yards, passed through a small village, also called Paorbel, where there is a splendid camping ground, fine mango and fig trees, giving grateful shade. There is some garden cultivation, plantains, castor-oil trees, and cholum near the village.

Again entered sál jungle and crossed a stream (20 feet by 7 feet) with sandy bed and clay banks at 2 miles, continued through sál jungle up to the village of Odepur at 3 miles

6 furlongs, 200 yards; some garden cultivation, consisting of tobacco, plantains, castor-oil trees, and cholum; some wet cultivation in low swampy land near the village.

After crossing this swamp, again passed through sâl jungle to the village of Mohundi at 6 miles; another small village of the same name lies 2 furlongs further on; a stream with rocky bed and well-defined banks of clay flowing between the two. In the latter village there is an iron-smelting furnace at work, and near each there is some wet cultivation; tobacco, cholum, castor-oil trees, and plantains are largely cultivated in gardens. Passed through sâl jungle until reaching camp at Gurjinga at 9 miles, 6 furlongs, 180 yards from Paorbel. This is a small village in a clearing in the jungle surrounded by a fence of stakes; part of the enclosure is under tobacco, cholum, plantains, and castor-oil tree cultivation; camping ground not good, and water abominable.

*Gurjinga, 30th January 1882. Distance from Raipur 129 miles, 5 furlongs, 167 yards.*—Left camp at 6 A.M. through sâl jungle, passing through a belt of good forest. Many trees (sâl) measuring 11 feet in girth, 4 feet above the ground; soil sandy red clay.

At 1 mile, 5 furlongs, 100 yards, crossed a stream (18 feet by 8 feet) with sandy bed and well-defined banks of clay; and a second stream at 2 miles, 2 furlongs, with rocky (gneiss) bed and banks at the crossing, and for some distance up stream (58 feet by 9 feet).

At 3 miles 2 furlongs crossed a third stream (40 feet by 8 feet), and at 4 miles, 2 furlongs, 160 yards, a fourth stream (20 feet by 8 feet), both streams having rocky beds and banks. Reached the village of Kurulubahal at 5 miles, 4 furlongs; here there is an excellent camping ground, a large clearing and good shade from mango and fig trees. There are also some fine ippa trees here, and good water is procurable; an extensive area is under wet cultivation just outside the village; some garden cultivation also; soil quartz gravel.

At 6 miles, 6 furlongs, 145 yards, passed the small village of Serapur in a small clearing in the jungle. Proceeded through alternate belts of sâl jungle, and abandoned clearings covered with grass 5 and 6 feet high, to the village of Bakuda; distance 11 miles, 6 furlongs, 200 yards. Camping ground not good; no shade; good water is procurable.

*Bakuda, 31st January 1882. Distance from Raipur 141 miles, 4 furlongs, 147 yards.*—Left camp at Bakuda at 6 A.M. through sâl jungle. Crossed the Dumabal river at 5 furlongs, 100 yards (90 feet by 12 feet), with sandy bed and well-defined banks of clay; after passing through a belt of sâl forest, crossed the Patibal river at 2 miles, 1 furlong (8 feet by 10 feet); the bed and banks of the river are rocky. After passing a very large area, recently under wet cultivation, entered the village of Bâmini at 3 miles, 6 furlongs, 110 yards; here there is an excellent camping ground in a fine large mango tope, and good shade. There are several good gardens with castor-oil trees, plantains, and tobacco cultivation.

At 4 miles, 7 furlongs, crossed a stream (18 feet by 9 feet) with sandy bed and well-defined banks of clay; there is much rock above the crossing.

At 5 miles, reached the village of Barhona, a small village in a clearing, castor-oil and plantain trees in gardens, and fine mango and tamarind trees outside the village.

Crossed a stream at 5 miles, 7 furlongs (18 feet by 12 feet) with sandy bed and clay banks, and reached the village of Birondi at 6 miles, 2 furlongs, 130 yards; here there are gardens with sugarcane, plantains, castor-oil trees and tobacco, and a large area of wet cultivation. There are some fine mango and tamarind trees south of the village, and good water is procurable from the stream.

At 7 miles, 4 furlongs, 100 yards, passed the village of Kochtiamo, where there is a tank and an irrigation channel about a quarter of a mile long; the village is small, but there is a large area under wet cultivation.

At 8 miles, 7 furlongs, reached camp at Omorkôt, a large village with a large area of wet and dry cultivation; tobacco, castor-oil trees, and plantains in gardens, and several descriptions of country vegetables. There is a police station-house here and a force of 18 Police Constables and 1 Head Constable. The camping ground is in a fine tope, where there is good shade; good water is procurable from the river at hand.

Total distance from Raipur 150 miles, 3 furlongs, 202 yards.

OMORKOT,  
1st February 1882.

J. CORMAC,  
Sub-Engineer.

## XVII.

### D.

MR. CORMAC'S Diary of Reconnaissance from Pupogaon *via* Jeypur to Kâraputi, 15th and 16th February 1882.  
Distance 24 miles.

*15th February 1882. Pupogaon, 1,981 feet above M.S.L.*—left camp at 6 A.M. over waste land, passing the village of Pupogaon at 3 furlongs, 160 yards, where there is a tank of good drinking water and a large number of fine mango and tamarind trees giving good shade. After leaving the village, passed through a considerable area of swampy paddy-fields, and crossed a stream (30 feet by 8 feet) with muddy bed and clay banks which are not well defined.

At 1 mile, 6 furlongs, 184 yards, passed the village of Dangragaoon, a small cluster of wretched huts with a small area of paddy-fields.

At 3 miles, 1 furlong, passed the village of Dondasanogoda on the left; on right sâl jungle with jack and ippa trees; soil sandy; a large area of rice-fields just beyond the village.

At 4 miles, 2 furlongs, 200 yards, crossed a stream (40 feet by 11 feet) with well-defined banks and muddy bed, and then through paddy-fields to the village of Randapali, which was passed at 4 miles, 7 furlongs, 94 yards. There are only 10 houses in the village, which has a tank of good drinking water and several fine topes of mango and tamarind trees.

At 6 miles, 2 furlongs, crossed the Potra stream (120 feet by 14 feet) with well-defined clay banks and sandy bed; a fine tope of mango trees on the left bank; on each side of the stream there is a wide area of rice-fields.

At 7 miles, reached the village of Umerigaon with 60 houses and several fine mango topes; a blacksmith was at work in a small shed making knives. At this village I was met by the Dewan of the Maharajah of Jeypur. Here I joined the road from Boriguma to Jeypur. Crossed a stream in swampy ground (18 feet by 8 feet) and, passing over rising ground uncultivated, crossed a second stream (12 feet by 8 feet); small scrub jungle to the right and paddy-fields to left. In the swampy places the road is in embankment about 2 feet high; the streams are not bridged. Crossed high ground, along the road, and then turned eastward along a roughly-made narrow road, crossing several small streams leading into a large tank covering an area of upwards of half a square mile; tank on the right, and a halting bungalow on the left; then through a fine mango tope, and past a second large tank, to the camping ground in a mango tope, outside the town of Jeypur. Distance traversed 10 miles, 4 furlongs. There is a good bungalow here for travellers, and good drinking water; there are large topes of fine mango trees covering a very large area and giving good shade, which make excellent camping grounds. There are about 2,500 houses in the town and 8,000 inhabitants; about 20 houses are tiled and one terraced, the remainder being thatched.

The Maharajah of Jeypur resides in the town; a palace of brick and stone is now being constructed in the enclosure, which contains a number of small dirty buildings, and the Maharajah's present residence and offices. There are a Sub-Magistrate, an Inspector of Police, and 15 Constables in the town; there is an Elementary School maintained by the Maharajah.

The produce of the taluk consists of rice (sold at 30 seers per rupee in Jeypur), ragi, green-gram, dholl, Bengal-gram, wheat (in the Kotpad Taluk), and linseed. Sál, jack, ippa, tamarind, matti and mango trees (especially the latter) are abundant. There are some silk-weavers in the town, who procure the cocoons of the tasser-worm from Kotpad. About 30 goldsmiths, 30 carpenters, and ten smiths reside in the town; but no bricklayers, these being brought up from Sálur when required; stone-cutters are obtained from the Ganjam district. Kunkur limestone is obtained from Jaganathapuram, a village about 3 miles distant from Jeypur. The town lies in a hollow, near the foot of the hills; the site does not seem a healthy one. The unhealthy season is in July and August, after the commencement of the rains.

The adjacent hills are gneiss; laterite is also found in abundance.

16th February 1882. Jeypur, 1,955 feet above M.S.L.—Left camp at 6 A.M. through mango topes, and joined the road from Jeypur to Kúraputi at 5 furlongs. Travelled along the road from this place, with small scrub jungle on both sides (ground side-lying and rocky), crossing some small streams, to 2 miles, when a large stream (63 feet by 14 feet) with rocky bed and well-defined banks was crossed. This spot is only 24 feet higher than the starting point of this day's march, and up to 2 miles, 4 furlongs, 70 yards, the rise is inconsiderable; from here, however, to 3 miles, 2 furlongs, 160 yards, there is a rise of 348 feet, the gradient being 1 in 12; in the next half mile there is a descent of 84 feet; then a continuous rise to 5 miles, 1 furlong of 622 feet, the gradient being 1 in 11½; a fall of 84 feet follows in the next half mile, and then an ascent by a gradient of 1 in 40 to 6 miles, 3 furlongs, 160 yards.

The village of Bojepodur, which was passed here, lies some distance away to the right. Crossed undulating and hilly country, with some good timber trees about, and a small area of sal jungle about a mile distant. The country is cleared of jungle up to the village of Damiguda at 11 miles, 2 furlongs, 110 yards; this is a small village of about 20 houses, with a small area of cultivated land near; a stream lies between the village and the road.

At 12 miles, reached the saddle overlooking Kúraputi (height 2,999 feet) and descended to the town of Kúraputi at a gradient of 1 in 12; passing through the station along the road, reached camp near the quarters of the Special Assistant Agent at 13 miles, 3 furlongs.

KURAPUTI,  
19th February 1882.

J. CORMAC,  
Sub-Engineer.

## XVIII.

### E.

No. I-O, dated Omorkót, the 1st February 1882.

From—Sub-Conductor J. CORMAC, Sub-Engineer,

To—K. F. NORDMANN, Esq., Executive Engineer, on Special Duty.

I BEG to inform you that, in obedience to your orders, I left Raipur on the 16th ultimo for Omorkót *via* Dhamtari and Kankér.

2. The road from Raipur to Dhamtari is gravelled for about half a mile outside Raipur, after which there is simply a cart track, without any surface covering; it has been so worn by traffic that in some places the level is lower than that of the adjacent fields; avenue trees have been planted all along, but are not now in a very healthy condition; margosa trees, which give little or no shade, compose the avenue for quite 15 miles.

3. The line is bridged for the first 10 miles, and for this distance the soil is generally sandy ; beyond it is black cotton soil, full of holes and fissures ; and during the rains the road will be almost, if not quite, impracticable for carts.

4. No large streams are crossed between Raipur and Dhamtari, and the country is almost level ; it is dotted over at present with large stacks of rice straw, which testify to the abundance of the crop recently cut.

5. The grains chiefly cultivated are rice, wheat, linseed, Bengal-gram, green-gram, and ragi ; rice is now being sold at Dhamtari at 55 seers and wheat at 40 seers per rupee.

6. The chief exports are rice, wheat, linseed and lac. I met 16 carts leaving Dhamtari laden with the latter, and passed 40 camels going there for loads of the same ; this lac is the product of an insect, the *Coccus ficus*, which deposits its eggs upon certain trees, and covers them with a reddish resinous substance which is lac, and intended as a protection to the eggs.

7. Some native cotton cloths are manufactured at Dhamtari and tasser-silk cloths at a village 20 miles distant ; the tasser silk-worm being found in all the sâl jungles in this part, feeding upon the leaves of the sâl and the matti.

8. There is no systematic irrigation, the crops being dependent on the seasonable fall of rain ; there are numerous tanks kept in admirable repair by the ryots at their own expense ; these are, however, generally used for drinking purposes, and are not situated so as to be of much use for irrigation.

9. The soil is very fertile, and the country passed through is cultivated to the fullest possible extent ; there are but few small patches of uncultivated land to be seen.

10. There are good topes of fine mango trees near the villages, but no other timber was seen except a few unhealthy-looking acacias, dotted over the country near Dhamtari ; firewood is scarce and dear.

11. Dhamtari was reached on the 19th ultimo. The town has a population of about 14,000 inhabitants and about 5,000 houses, chiefly mud huts ; there is a tahsildar's cutcherry, post office, police station-house, and hospital in the town, which is surrounded with magnificent topes of mango and tamarind trees ; there are several fine tanks near the town.

12. Limestone is procurable near Dhamtari, and a fair supply of labor, cooly-hire being one and-a-half annas per day per men ; and for such bricklayers, carpenters and smiths as are to be had there, from three to five annas per day.

13. Leaving Dhamtari on the 21st ultimo I crossed the Mahânâdi river twice and the Makri and Duhd rivers, reaching Kankér on the 23rd ; the latter river divides the town of Kankér into two portions.

14. There is a good and easy cart track all the way from Dhamtari to Kankér ; and as the soil is more sandy, the line will not be so difficult in the wet weather as between Dhamtari and Raipur.

15. The country between Dhamtari and Kankér is jungly, only one-third (or thereabouts) of the whole area being under cultivation ; so, as far as I could learn, the Kankér State produces little more than is required for consumption within its own limits, and the exports are inconsiderable.

16. The grains chiefly cultivated are rice, wheat, green-gram, Bengal-gram, horse-gram, and ragi.

17. Mango and ippa (mhowa) trees abound ; the spirit distilled from the flowers of the latter tree is sold in the villages at one anna per quart ; a few teak trees were also met with, but none of any size.

18. The hills, which run almost parallel with the track for about 14 miles from Dhamtari, are well wooded, chiefly with ippa, matti, and bora trees ; a deal of care is given to the planting of mango trees, several topes of young trees having been passed on the way.

19. The villages in the Kankér State are small, and, generally speaking, composed of miserable mud hovels ; the town of Kankér is a little better in this way, the huts being somewhat larger, and possessing a temple and house belonging to the Rajah, built of brick in chunam ; the villages are all fenced in as a protection against wild animals.

20. The camp at Dargahan was twice alarmed in the night by a cheetah, and the footprints of one of these animals and of a tiger were observed for a distance of 2 miles along the track traversed ; wild buffaloes are said to be numerous here, though none were seen by me.

21. The country near Kankér is hilly, chiefly rocky hills of gneiss with low jungle. Kunkur limestone is found at several places, and was seen near Charima and Kankér. There are two bricklayers, two smiths, and one carpenter in the latter town, their hire being two and-a-half annas per day ; cooly-hire one anna per day.

22. I left Kankér on the 25th and passed up the valley of the Hatkul river through dense jungle, with fine matti trees here and there, and thick undergrowth, meeting with sâl trees on entering the Buster State.

23. I camped the same night in the jungle ; and having sent on my baggage the next day via the Tâl Ghât to Siduwan on the plateau, I started up the valley of the Hatkul river, passing Chiprail, making my way, where the jungle on the banks was impenetrable, in the bed of the stream ; there was no path, but the perambulator was run for 7 miles (5 beyond Chiprail) and the barometer showed a rise in this distance of only 130 feet.

24. From this point the perambulator could not travel, and had to be carried ; the banks were covered with dense undergrowth, quite impenetrable, and were in some places precipitous ;

so that I had to make my way up the bed of the stream, climbing at times, on my hands and knees, the rocks being as slippery as ice in several places; about 2 miles were covered in this manner, the aneroid showing a rise in that distance of 270 feet; a path was then found, and the perambulator started along it, measuring 2½ miles to camp with an ascent of 260 feet; this was the highest point reached, and the approximate height above mean sea level was 2,050 feet.

25. From Siduwan the country commenced to fall, and continued to do so until Omorkot was reached.

26. The villages passed are composed, generally speaking, of a few miserable huts, built near water-courses, and fenced round with stout stakes placed closely together, about 6 feet high, inside which is some garden cultivation: tobacco, castor-oil trees, plantains, and the usual native vegetables. The villages are usually about 3 miles apart, with alternate belts of sal forest and abandoned clearings intervening.

27. The area cultivated is certainly not more than one-twentieth of the whole, so that there is ample room for a large number of immigrants; this remark applies to the whole country from Kankér to Omorkot.

28. Good camping grounds were observed at Paorbel, Kurulubahal, Bamini, and Omorkot; near the other villages passed all trees have been cleared, and there is no shade. The water-supply on the plateau is not good; and as there are no means of storage, there must be a scarcity in the dry season.

29. Several belts of fine sal forest were passed through; some trees measuring 11 feet in girth, 4 feet above the ground.

30. The soil in the hollows and swampy places is black clay, and in the portions at a higher level sandy reddish clay.

31. The country is sparsely populated, and all labor will have to be imported; the clay found everywhere is suitable for bricks; and stratified gneiss, suitable for building purposes, is found in several places; kunkur limestone is found here and there, and will, I believe, be found all over the plateau if searched for; there is an abundance of good sal wood in Bustar and Jeypur.

## XIX.

### F.

Reports by Colonel A. FRANCIS, late Executive Engineer, Raipur Division.

#### *Report on the Road from Raipur to Dhamtari.*

THE total length of this road from the cantonment boundary is 38 miles.

*Soil.*—Of these only 8 are moorum, sandy loam or laterite; the remaining 30 are black cotton, very deep; and at least 10 miles of these 30 are under water from 6 to 16 inches deep for from four to five months during the rains, owing to the road being on the same level or a little lower than the rice fields which are on both sides.

*Masonry Works.*—The first six miles and a quarter are bridged with seven drains and bridges; the waterway of five of these is too little, and the approaches have been breached.

These breaches have been now sloped down to allow high floods to pass over. It would be an improvement to rivet both sides of these slopes with a masonry wall, as then a foot of good broken stone could be rammed between them, and a causeway would be formed that would remain hard even after rain.

*Nullahs and Rivers.*—Between the last bridge built and the village of Bhukara, a distance of 18 miles, there are ten nullahs, all of good size, from 15 to 60 feet broad, and which have all soft and swampy bottoms, and offer considerable obstruction to traffic up to the end of January, and even when the bottoms become dry and hard, yet from the very steep slopes leading to them they detain heavily laden carts for hours.

*Improvements required.*—These nullahs should have causeways; and instead of the raised causeways, such as have been built on the Belaspur and Sumbulpoor road, it would be both better and cheaper to build walls, level with the bed of the stream and running up the approaches as far as high-water mark, on the up and down stream sides, and then fill in between them a foot of hard road metal well consolidated.

There is but little scour, and it would stand well; the raised causeways become very slippery and covered with green moss.

From Bukara to Dhamtari there is only one causeway required, but that one, though not large, will have to be carefully constructed, as it is in one of the submerged lengths; and in the rains the first intimation a traveller has that there is a nullah is finding the water above his saddle flaps. A raised causeway with hand rails above high water level, and with openings for the bottom water to pass through, would probably be the best for this. All the approaches to these nullahs require being brought to a proper slope, which could easily be done.

The map shows that the Karun river runs with the road on the west side at a distance varying from 1 to 3 miles; the road runs north and south nearly, and the drainage is from east to west.

The country is very flat, and the road running across the drainage has suffered very much from the scouring of its side ditches; in some places they are 8 feet deep.

These side ditches have been dug between the road and avenue, and should be filled and dug outside the avenue, or, better still, omitted altogether, as, owing to the light nature of the soil, the smallest stream of water cuts deeply in a few hours until the harder subsoil is reached.

To convert the present road into a bridged road for all weathers would be very expensive, as on an average the whole 30 miles of black soil would have to be embanked about 3 feet to lift it 1 foot above high-water mark.

Eleven streams would have to be bridged, all of which, owing the proximity of the Karun river, rise and overflow their banks when that river is in flood ; besides these eleven bridges numerous small 3-feet drains would be required.

The present state of the road shows how dangerous it is to carry the water from one nullah to another along the sides of the road.

Report on the Road from Dhamtari towards Raigarh as far as the Boundary of the Central Provinces.

*First Stage, from Dhamtari, to Kukrel, Distance 8½ Miles.*

STARTING from the new Tasilee, the main street of Dhamtari is broad for a short distance ; it then contracts into a narrow lane, the houses having encroached on it, until there is only about 9 feet left ; and this in the rains is knee-deep in water. After getting clear of the town there is a mere track to the Achota Ghât ; across the Mahânaidi river the road requires marking out.

The soil is very sandy and heavy, but there is moorum in the vicinity, and a good road could be made at a small expense. The road could also be made good up to the Tasilee with very little damage to the houses, as by a little care in lining, it would be chiefly compound walls and outhouses that would be taken down.

The distance from the town to the river is 2½ miles. The banks of the river require but little sloping ; the north bank especially is easy ; the south requires a little done to make an easy slope. A memorandum of probable expense will be given at the end, as more easily noted than is scattered through the report.

After crossing the river the cart track is well defined ; the soil is sandy for the first half mile ; jungle open. The soil then changes to good moorum up to the village of Bhoina, which is 4½ miles from Dhamtari, where the soil becomes a sandy loam, varying from hard to very sandy, and continues with little change to Kukrel.

The two nullahs on the road are easy, with hard bottoms, with stone at hand for causeways, if considered necessary ; but unless the traffic increases very considerably, the causeways will not be required.

Water is procured from a nullah which, though indifferent in quality, is sufficient now ; later there must be some scarcity.

The Malguzars of this place are Baboojee Huddut and Jinyars ; they appear well-to-do, and informed me they held other 34 villages ; they have an elephant and good ponies, but professed entire ignorance as to the road beyond their own village.

From Kukrel to the village of Bunbugowd, about 1½ miles, the track is good and easy ; and water is here also procured from the nullah below the village. After passing this the line of road as marked on the map, Sheet No. 1 of the Ganjam and Orissa Topographical Survey, runs over rocks and stones ; to avoid this the cart track turns to the village of Komda. A glance at the map will show that the line runs along a watershed ; and up to the borders of Bustar near Burgudee the tracks are well chosen in this respect, avoiding nullahs and cross drainage ; and the points passing from one watershed to another are wonderfully well chosen.

*Second Stage, from Kukrel to Dokal, Distance 10½ Miles.*

The whole length by the old track is 8 miles to Dokal from Kukrel, but the cart track is a mile and-a-half longer ; still it is to be preferred for a fair weather road.

The jungle is of the same description as to Kukrel : tall trees without much girth, only fit for poles, with no underwood. The grass has mostly been burnt. The headman of Dokal is Mithoo Naik, who gave a good deal of information willingly. He is a very intelligent old Brinjarri ; he has dug a tank and built a temple, and possesses about 100 head of cattle.

*Third Stage, from Dokal to Gatasili, Distance 10 Miles.*

From Dokal there are three tracks, but only No. 1 is good for carts ; the second is at present impassable except for foot-passengers and pack animals ; the third, an empty or lightly laden cart can pass with difficulty. No. 1 goes by Parwari, Donora, Palgaon, and on to Gatasili, a very roundabout track, but easy ; the extra length is 3 miles.

The second is that shown in sheets Nos. 1 and 3 of the Ganjam and Orissa Topographical Survey, and the only difficulty is at the crossing of the Silari river. Should this line be taken—and it is the best of the three—a proper crossing must be traced, which is not difficult.

The present crossing is taken straight down the face of the hill on to a low spur, and then, turning on the spur, nearly straight to the river ; this point on the spur should be retained, and the slope worked from it upward along the side of the hill where any desired gradient can be worked out ; and downwards, first keeping a little way along the side of the hill, till sufficiently low, and then bending round by the left to the river. A trial trace should be first

made, 3 feet wide; there will not be much blasting; most of the rock is detached boulders. For approximate expenditure, see memorandum at the end.

The third line leaves Parwari on the left and runs by Attakolee to Gatasili. The crossing of the river is easier than in No. 2, but the nullahs that have to be crossed are a little larger, and it approaches Gatasili from the wrong side of the tank through swampy ground; and notwithstanding easier crossing and less clearing of jungle required, will not be so satisfactory in the end. The track is here, as elsewhere, generally about 8 feet broad; in places it is much more, even 30 feet, and looks like a road; but this is only for very short distances. Up to Dokal the road may compare favorably with the road from Busna to Buruankera on the Sumbulpoor road; and after this crossing is made and jungle cleared, &c., the road on to Gatasili will be equally good. There are in this stage six nullahs to cross, besides several smaller drainage channels; but all have hard bottoms, and can have easy slopes to their banks.

The ground near Parwari looks as if it would be very swampy in the rains and up to November.

*Fourth Stage, from Gatasili to Burgudee in Bustar Territory, Distance 9½ Miles.*

From Gatasili to Burgudee the road is everywhere passable; where there is jungle the trees are thicker together, but still there is very little valuable timber, and open spaces are more frequent than in the second and third stages. There are four nullahs in this stage; the one nearest Burgudee will be the longest, and it is the only one that has a bad bottom.

The detour taken by the road here is necessary, for on examination of the ground to the right, with a view to cutting off this bend, it proved to be very swampy, and a long and heavy embankment would be necessary; besides the nullahs here would have to be bridged, as it is very muddy and holds water to the end of the hot weather. The road crosses the boundary of Bustar near the 9th mile from Gatasili, and the town of Burgudee belongs to Bustar.

The Sihoa road turns just before reaching Burgudee, from which Sihoa is about 4 miles. Several of the villages marked on the map have been deserted. Gatigaon remains; Kongera and Paklupara have disappeared; but a village in these parts means a few huts made of sticks without mud walls, and very imperfectly thatched.

Burgudee is the best-to-do village on the line; gram and other supplies are procurable. There was a difficulty about guides here, and a peon had to be sent down to Belargaon to bring up a guide, the headman of Burgudee steadily refusing to give any guide. When guides had been procured from Belargaon, he then gave one who knew the country well, though for four hours he had declared not a man in the village knew the road to Borai.

*Fifth Stage, from Burgudee to Borai, Distance 19½ Miles. From Borai to the Boundary, Distance 3 Miles. Total Distance from Dhamtari to Boundary 61 Miles.*

From Burgudee hills are visible on both sides, and also in front; the road here is very undefined; apparently it is cultivated in the rains, and the traffic picks out a path in the dry weather. Up to this point there passed on an average 12 carts and 30 foot-passengers a day and 60 head of pack cattle every other day.

From this point carts cease; only ten pack cattle pass in three days and about 15 foot passengers. At Keontipara, ½ of a mile from Burgudee, the Mahanadi is crossed; this is also the boundary of Bustar. From this the line is in Kalsa; the road runs by Bamka to Belargaon; this latter is a very straggling village. Three nullahs are passed, and the ground will be swampy until late in November. After the road is fairly opened, an embankment will be needed here and causeways; but the whole of this 3 miles require lining out; probably a better crossing could be found for these nullahs.

The country changes from Belargaon; the hills draw close to the road; the jungle is thicker and the trees are of better size. The track continues fair after passing Belargaon; but 7½ miles from Burgudee the road runs round a very steep hill, marked A on the trace; this is rocky, with a nullah on the right, and will have to be worked out. The whole road from Burgudee should be relined and straightened, the jungle cleared, and nullahs sloped; the general direction cannot be altered on account of the ground.

The road from this point is only a foot-path, though four carts came down with the camp with only one breakage. 12½ miles from Burgudee the Chita river is crossed for the first time; during the day an attempt was made to see if the road could be turned round this river and be brought down the left bank on the line shown by red dots B B B; but the ground is very difficult, and the expense of making even a 12-foot track through it would be great. To ascertain the feasibility properly, a trial trace should be cut; but the natural difficulties (rock and ravines) appear to be too great for a line of road the traffic on which can never be anything but very small. Crossing the Chita river, the road gets a little better, and the path is more defined; for merely a fair weather road the fact of crossing the river twice is of little consequence, as the crossings can be made very easy.

Towards the top of the ascent the brushwood commences and becomes thicker as you proceed. Before reaching Borai it is thick; the trees along this portion of the road are larger; several fine sal trees were seen. The jungle becomes more open; after reaching Borai it ceases, fields and low hills replacing it. About 2 miles of jungle have been cleared on this line of road before reaching Borai, but the trees have been cut too high up, and the stumps are rather long and sharp; but still it renders the track easier. From Borai, Baniadi village is visible; and between

this and Hatmoli is the boundary dividing the Central Provinces and Jeypur. This line runs through fields, and should be embanked from  $1\frac{1}{2}$  to 3 feet high. The nullah is a very troublesome one, and as there is plenty of timber lying and rotting within 3 miles, I would suggest a good substantial well-put-together wooden bridge; the only cost would be the carriage and labor. Care should have to be taken to clear all grass from its vicinity early in November to prevent its being burnt; and a bridge could be put up that would last for 20 years.

From the boundary Raigarh is about 15 miles; from thence to Nárangpur is 65 miles; the road is not yet in hand on this section. From Nárangpur to Kúraputi there is a dry-weather carf road, distance 36 miles. Potinghy Ghát is 28 miles from this, and Sálur 24 miles beyond Potinghy. This would fix Potinghy, which is not marked on any of my maps, at about  $18^{\circ} 50'$  north and  $83^{\circ} 12' 30''$  east. Sálur is well known; it is 66 miles from Calingapatam 52 miles from Bimlipatam, and 66 from Vizagapatam; the new ghát commences 4 miles from Sálur and is 20 miles in length. The distances given are by the road, not straight across country; the ghát is not expected to be finished till 1878, by which time the rest of the road may probably be somewhat advanced. In looking at the Ganjam and Orissa Topographical Survey it appeared likely that a line from Borai, leaving Hathma to the left, up to Gorawan would probably be easier than the Chita river route; although if this line should be decided on, owing to the swampy nature of the ground near Kaunkera and Mainpur, it will still be advisable to run the road by Borai, joining into the Chita river road on the ground just above the village.

*Returning from Borai to Dhamtari* the first stage had to be any place where water was to be found, as there are no villages on the line. The spot selected was Birpani, just at the junction of the roads from Hathma and Kosmi to Gorawan. It takes its name from a large bir tree.

*First Stage, on return from Borai, by Hathma to Birpani  $10\frac{1}{2}$  miles. From Border to Borai, 3 Miles, Total  $13\frac{1}{2}$  Miles.*

The first 7 miles are easy; the proper line would be somewhere between the two red-dotted lines, but the jungle is too thick to decide without cutting a trial trace.

The next 4 miles, after crossing the Dhamtari border, present as many difficulties in the way of rock-cutting and clearing as the Chita river route, though only one nullah of any size is crossed up to this point.

There is a thick bamboo jungle for these last 4 miles, with rocky hillocks on both sides of the path; and the line is exactly that shown in the map, with the drainage sometimes from right to left and sometimes from left to right.

*Second Stage, from Birpani to Borsidonga,  $6\frac{1}{2}$  Miles.*

The nullah is crossed immediately after leaving Birpani, and long slopes with some rock-cutting will be required. Bamboo jungle continues as before up to the place where the road for Amgaon turns off; here it ceases; open jungle commences, the country becomes more and more clear, and the soil changes from good to black cotton. From this point up to Borsidonga will be wet and swampy until January. Any line can be taken here; the carts drive all over the country. From Borsidonga hills are visible on all sides, from 1 to 5 miles distance.

*Third Stage, from Borsidonga to Jamgaon,  $9\frac{1}{4}$  Miles.*

From Borsidonga up to Deklaond there is no defined road, but carts drive over the country in any direction they wish, making a detour to avoid any difficulty. The ground is usually black, and will be swampy till late; it is quite dry now.

The Mahánadi is crossed near Déokot, and is about 250 feet broad. There is no jungle, only pollard trees. At Deklaond a road joins from Bamka, and from this point there is a well-defined route; the pollard trees continue, and soil changes to hard sandy loam. There are after this about 2 miles of uncut jungle, open and with no large trees. Passing this, the trees have again all been lopped; and on to Jamgaon the country continues the same, with here and there short distaances of swamp, or what would be swamp in the rains and cold weather.

*Fourth Stage, from Jamgaon to Madgadaian  $9\frac{1}{2}$  Miles.*

From Jamgaon the track continues good and well defined; country open; trees are lopped as before; a river about 100 feet broad is crossed, near which is a narrow belt of uncut jungle; the soil is black cotton with a few yards of hard kunkur now and then. The small drainage channels would be troublesome if there were any traffic. All the large nullahs have good sandy bottoms and easy slopes. There is a little cultivation at the village of Bansoli; after this there is a mile of very good road, and then three chains of swamp, after which for 3 miles the road is good, running through open jungle; and the soil improves and continues good up to a small drainage channel which has a soft bottom, on the other side of which is black soil until the nullah is reached, on the bank of which is the village of Madgadaian.

*Fifth Stage, from Madgadaian to Themli, 9 Miles.*

This march is a difficult one. Carts can go, but nullahs are numerous. The road is shut in with rocky hills, and so confined that one large nullah is crossed four times; six other

nullahs are passed, and everywhere the track is sandy and heavy, except where it is rocky. There are about  $2\frac{1}{2}$  miles of rocky track on which a good deal of labor would be required to make it easily passable, and the line is one that would not be chosen if there was the slightest possibility of the road being bridged or much improved.

*Sixth Stage, from Themli to Dhamtari, 8 Miles. Total from Border to Dhamtari  $56\frac{1}{4}$  miles.*

From Themli the road crosses the Silari river, and is shut in for about  $1\frac{1}{2}$  miles between the river and a ridge of rock ; the hill then recedes from the river, and the track runs through cultivation and waste to the Mahánadi, which is crossed at Rodree ferry. The track up to this point is very heavy. After crossing the river, there is half a mile of good hard soil, and then alternately sand and swampy ground, to the town of Dhamtari.

#### Summary.

From the above it will be seen that there are two tracks, one by Kokrel, Dokal, Gátasili, Burgudee and Boráí, 61 miles in length, and the other by Themli, Madgadaian, Jamgáon, Bursidonga, Birpáni and Boráí,  $56\frac{1}{4}$  miles.

The first runs, with exception of  $1\frac{1}{2}$  miles, entirely through country belonging to the Raipur district and under the Tasilee of Dhamtari ; it is now used by carts as far as Burgudee, offers no great obstacles, and up to this point can be improved, to any extent that may be considered advisable, by a corresponding expenditure. The soil on the whole is favorable, and the only heavy work is that detailed from Burgudee to the boundary,  $22\frac{1}{4}$  miles. This road is also linked by a fair cart track to Sihóa from Burgudee ; and what cart traffic there is, follows this line.

The second line is through a much more open country, and the soil is generally unfavourable, swampy and heavy ; and it would be a good month longer than the first route in becoming dry. The last two stages from Madgadaian to Themli and Dhamtari is also very difficult, and could not be taken for anything but a fair-weather road. The distance is  $4\frac{1}{2}$  miles shorter than the first route ; but owing to the heaviness of soil, carts would take longer to traverse the shorter distance ; it also runs for half its length through Kankér territory, and the Sihóa carts would have to follow the first route as far as Bamka before being able to join into this track.

Under these circumstances the first appeared the best, and a memorandum of expenditure required to open it for a cart track, 15 feet wide, is appended.

DRUG,  
18th March 1876.

A. FRANCIS, *Lieut.-Colonel,*  
*Executive Engineer, Raipur.*

#### XX.

No. 60 W., dated Waltair, the 30th March 1882.

From—K. F. NORDMANN, Esq., Executive Engineer, on Special duty,

To—The Secretary to Government, Madras, Public Works Department.

Adverting to my letter, No. 38-K, dated 25th ultimo, with which I submitted my report on the reconnaissance from Raipúr to Koraput, I have the honor herewith to forward\* the longitudinal sections (specified below) of the routes traversed, as

\* In two registered covers. well as cross sections of streams.

14 longitudinal sections of the line from Raipúr via Dhamtari, Kankér and Banskót to Omorkót (150 miles).

2 longitudinal sections from Pupagáon via Jeypur to Kuraputi (24 miles).

21 longitudinal sections of the line from Raipúr ávi Rájim, Noagarh, Háthgáon, Omorkót, Nárangpur, Ránigar, Mádéoputi to Kuraputi (218 miles).\*

27 cross sections of streams, exceeding 30 feet in width, on the route via Rájim, Noagarh, &c.

2. The above sections have been unavoidably delayed, owing to the want of tracing cloth, which has since been received. One set had been prepared at Kuraputi, but was spoilt and had to be done over again.

3. Revised sections of the line from Ryaguddah via Singapore, the Músa Ghát, Bondesor and Dádpúr to Bôgor, promised in paragraph 3 of my letter, No. 20-B, dated 4th December 1881, are under preparation and will shortly follow.

4. The final report, and drawings belonging to the last section of the reconnaissance, *viz.*, the crossing of the Jeypur plateau and the descent down the Eastern Ghâts, are now in hand, and will be submitted from here before I embark for Madras.

## XXI.

No. 72 W., dated Camp Waltair, the 14th April 1882.

From—K. F. NORDMANN, Esq., Executive Engineer, on Special duty,

To—The Secretary to Government, Madras, Public Works Department.

As promised in paragraph 3 of my letter No. 20-B., dated 4th December 1881, and paragraph 3 of my letter No. 60-W., dated 30th March 1882, I have the honor herewith to submit 11 revised longitudinal sections of 95 miles of country reconnoitred by Mr. Sub-Engineer Cormac, in November last, between Ryaguddah, the Músa Ghât, Bondesor and Bôgor.

2. The altitudes have now been corrected, with reference to the aneroid observations at the sea coast, which had not come to hand when the original calculations were made; and I beg that the heights on the original sections and in the reports, may be corrected according to the figures now furnished, which can be relied upon as correct.

3. As already intimated by a telegram, dated the 10th instant, I have been unable to finish the report and sections for the last portion of the reconnaissance, and to wind up the affairs of the reconnoitring party before this; but I hope to do so by the end of the week, and intend to embark for Madras by the steamer of the 19th instant.

4. I shall thank you to instruct me whether I am to proceed to Ootacamund with my maps, field books and other papers, to give personally such further information, regarding the country reconnoitred, as the Government may desire to have.

5. Please address letters to me, till further notice, to *Madras—General Post Office*—to await arrival.

## XXII.

No. 74 W., dated Camp Waltair, the 18th April 1882.

From—K. F. NORDMANN, Esq., Executive Engineer, on Special duty,

To—The Secretary to Government, Madras Public Works Department.

IN continuation of my letter No. 38-K., dated Kuraputi, 25th February 1882, wherewith I forwarded my report on the reconnaissance of the country between Raipúr and Kuraputi *viâ* Omorkót, I have the honor herewith to submit my notes on the last section of the reconnaissance, *viz.*, from Kuraputi

\* In a separate cover.

Enclosures 3.

1 Book of Section.

1 "Notes."

1 Appendix A.

across the Jeypur plateau and down the Eastern Ghâts to Sálur; together with 17 sheets of longitudinal sections\* of the country traversed, illustrating the most practicable lines for a railway across the plateau and down to the plains; and three cross sections of streams.

2. In paragraph 5 of G. O. No. 2294 W., dated 16th September 1881, I was directed to ascertain the best of the alternative routes, (1) from Párvatipúram *viâ* Ryaguddah, east of the Noagarh hills, to Raipúr; and (2) from Sálur over the Jeypur plateau and through Noagarh, west of the above hills, to Raipúr.

3. All my papers on the subject are now before the Government. I have already, in my letter above quoted (paragraphs 19 and 20 to which I beg to refer), made an impartial, preliminary comparison between the two routes; and reviewing the whole circumstances again, I find a difficulty in arriving at a verdict as to which of the routes is the better.

4. Out of upwards of a thousand miles of country reconnoitred, two routes distinctly present themselves as (to my mind) equally eligible; and the Government, with my notes, reports and sections, &c., before them, will be able to choose the route that seems to answer those purposes best which the

Government have chiefly in view in this matter. These routes are laid down in detail on my maps, and they lie as follows:—

(1.) *East of the Noagarh Hills.*—Párvatipúram (395 feet), Ryaguddah (687 feet), Bisemkattak (1,154 feet), Ombadóla (1,196 feet), Asurgor (699 feet), Bôgor (625 feet), (cross the Tél Nadi); then following the course of the Sunder river *viā* Tukla (686 feet), Kariál (803 feet), Kúmúna (857 feet), Torbor (949 feet), Sialjóri (1,047 feet), Jalbal, Nára (1,010 feet), Súarmál, Patrapáli, Teli-banda (1,022 feet), Mahásamund (916 feet), Gorári (cross the Mahánadi), Arang (952 feet), to Raipúr (963 feet); distance 372 miles.

This is the route which was recommended to me by Colonel Shaw-Stewart, R.E. It is a very excellent route and by far the best to be found in that direction. It encounters scarcely any ghât work (except a little, north of Ombadóla), and its summit level is not more than 1,346 feet above mean sea level.

(2) *West of the Noayárh Hills.*—From Sálúr (570 feet) up the ghâts to Merialpád Saddle (3,250 feet), thence along the Upper Jeypur plateau (averaging 3,000 feet) to Chikapar and Dumriput; down to Mádéoputi (2,500 feet); then following the course of the Kuradi Nallah downwards to Ránigar (2,018 feet); from there across the Jeypur Champaign country (averaging 2,000 feet elevation) to Nárangpur (1,918 feet), Paparhandi (1,922 feet), Dabgaon (1,984 feet), Bijepur (1,955 feet), Omorkót (2,021 feet), Béra (1,967 feet), Raigarh (2,101 feet), to the edge of the Jeypur tableland near Kóliapodor (2,100 feet); thence following the drainage downwards *viā* Dindandi and Gourgáon to Risgáon (1,569 feet); from there along the banks of the Sorul or Sondor river *viā* Tumaribahál (1,441 feet), Baltema (1,295 feet), Benkura to Karti; there cross the Pairi river, then following this river *viā* Bourka (992 feet), and Kopra to Rájim (958 feet), there cross the Mahánadi, and then *viā* Uparwára to Raipúr (963 feet). The length of this line will vary from 356 to 343 miles, according to the gradients which may be accepted for the ghât portion.

5. On the western line the ghâts are to be encountered, with a summit level of 3,250 feet (Merialpád Saddle). The ghâts have been carefully explored with the result that six practicable lines have been found, *viz.*, five different lines to connect the Upper Jeypur plateau (having an average elevation of 3,000 feet) with the plains near Sálúr; and one line to connect the Upper Jeypur plateau with the lower plateau (which has an elevation of 2,000 feet).

6. The following are the different ghât routes, which have been described in detail in my "Notes" (11th and 12th March, and "Résumé")—*Vide Sections, Sheet No. 17:*—

- (a) From Merialpád Saddle to Páchipenta Saddle, *viā* Chandka, and Súnki valley, to the foot (4 miles north-west of Sálúr). Gradients varying from 1 in 50 to 1 in 75. Length 29 miles. Probable cost, at £10,000 per mile, £290,000.
- (b) From Merialpád Saddle *viā* Merialpád cutting (on the new Potinghi Ghât), Bittrah valley, Lávidy Saddle, High Súnkipenta, Súnki valley and Páchipenta Saddle, to foot. Gradients varying from 1 in 50 to 1 in 125. Length 32 miles. This is the longest route of all, and has the easiest gradients. Cost, at £10,000 per mile, £320,000.
- (c) From Merialpád Saddle *viā* Merialpád cutting, Bittrah valley, Lávidy Saddle, Chandka, head of Súnki valley, and Páchipenta Saddle, to foot. Gradients from 1 in 50 to 1 in 92. Length 29 miles. Cost, at £10,000 per mile, £290,000.
- (d) From Merialpád Saddle to Merialpád cutting; 2½ miles; gradient 1 in 92. From Merialpád cutting *viā* the proposed Wondranghy viaduct and Ródavalsa tunnel, to foot; gradient 1 in 50; length under 23 miles; total length 25½ miles. Cost, at £10,000 per mile (besides £50,000 extra for tunnel and viaduct), £300,000.

(e) From Merialpád Saddle to Merialpád cutting, as before,  $2\frac{1}{2}$  miles; gradient 1 in 92. From Merialpád cutting *via* the proposed Wondranghy viaduct and Ródavalsa tunnel, to foot; gradient 1 in 35; length 10 miles; total length 19 miles. This is the shortest practicable line, and has the heaviest gradients. Cost, at £10,000 per mile (besides £50,000 extra for tunnel and viaduct), £240,000.

The railway would traverse the upper plateau between the Merialpád Saddle and the Limka Saddle (near Dumriput), a distance of 33 miles.

(f) From Limka Saddle, which is 2,880 feet above mean sea level, *via* Mädéoputi and the Kuradi valley to the foot of the hills near Ránigar; an easy descent of 862 feet which in a length of 14 miles can be accomplished at an average gradient of 1 in 85. Probable cost, at £8,000 per mile, £112,000.

7. The total distance from Vizagapatam to Raipúr by the eastern or Párvatipúram route is 372 miles. By the western route, *via* the Jeypur hills, the distance would vary according to the gradients adopted for the ghâts.

By the longest ghât line, *vide* (b), paragraph 6 *supra*, the distance would be 356 miles, or 16 miles less than along the eastern route *via* Párvatipúram.

By the shortest line, *vide* (e), paragraph 6 *supra*, the distance would be 343 miles, or 29 miles less than by the eastern route.

8. The total probable cost of a narrow gauge line for each of the two routes (east and west of the Noagarh hills) would stand thus:—

*A.—East of the Noagarh Hills.*

	£
372 miles at £5,000	1,860,000
Add for some heavy work north of Ombadóla (5 miles at £2,000)	10,000
Add for bridges	30,000
	<hr/>
<b>TOTAL</b>	<b>1,900,000</b>
	<hr/>

The item of bridging is heavier on this line than on the other.

*B.—West of the Noagarh Hills.*

	£
Raipúr to foot of upper plateau at Ránigar, 204 miles, at £5,000	1,020,000
Ghât from Ránigar to Limka Saddle, 14 miles, at £8,000	112,000
Limka Saddle to Merialpád Saddle along the upper plateau, 33 miles, at £6,000	198,000
Ghât from Merialpád Saddle to foot in the plain (4 miles north-west of Sálur) by the longest route (b), 32 miles, at £10,000	320,000
Foot to Sálur and Vizagapatam, 73 miles, at £5,000	365,000
	<hr/>
<b>TOTAL</b>	<b>2,015,000</b>
	<hr/>
Or, Raipúr to foot of upper plateau at Ránigar, 204 miles, at £5,000	1,020,000
Ghât from Ránigar to Limka Saddle, 14 miles, at £8,000	112,000
Limka Saddle to Merialpád Saddle along the upper plateau, 33 miles, at £6,000	198,000
Ghât from Merialpád Saddle to foot by the shortest route (e), 19 miles, at £10,000	190,000
Add for Tunnel and Viaduct	50,000
Foot of hills to Vizagapatam, as before, 73 miles, at £5,000	365,000
	<hr/>
<b>TOTAL</b>	<b>1,935,000</b>
	<hr/>

9. As regards the gauge on which the new railway is to be constructed, it is, I submit, a matter for consideration whether a narrow-gauge line will fully answer the requirements of the great traffic, partly already existing and partly to be further stimulated and developed by the railway. It has to be considered that this railway will tap a large tract of country, about equal to France in size,

and with a population of some forty millions. But if, for reasons of present economy, the line is made a narrow-gauge one, I would strongly advocate that, in view of future requirements, all the bridges at least be built sufficiently strong to carry the additional weight consequent upon a broad-gauge line; in case the gauge should have to be eventually changed, as will most likely be the case.

10. If the railway is made by the eastern route *via* Párvatipúram, Ombadóla and Asurgor, the line would seem naturally to trend in a northerly direction, and might be continued from the last-named place *via* Banpur to Turla, there cross the Tél Nadí, then proceed along the left bank of the river *niā* Bamini to Sónpoor, and thence along the western bank of the Mahánadi, *via* Binka, to Sumbulpoor, crossing the Mahánadi there.

This subject has been alluded to in my letter No. 24R., dated Raipúr, 6th January 1882, paragraph 8.

11. In case the railway should be taken from Raipúr to Sumbulpoor direct, along the old trunk road, crossing the Mahánadi twice, namely, at Gorári and Sumbulpoor, the line from Vizagapatam need not go to Raipúr at all, but might from Jalbal be taken north, *via* Onki, along the eastern bank of the Jong river, and there join the line from Raipúr to Sumbulpoor; whereby about 55 miles of railway would be saved.

There need be no objection, on the score of economy, to crossing the Mahánadi twice, as above mentioned; for, if the line from Raipúr is taken north of the Mahánadi, by Belaspur, &c., the amount of drainage encountered there would considerably exceed that south of the Mahánadi *plus* the double crossing of the latter. This is accounted for by the numerous large tributaries entering the Mahánadi from the north between Arang and Sumbulpoor.

12. It is not advisable to take the line from Singapore *via* Lonjigar to Ombadóla, as there is much hilly ground (a small ghát in fact) encountered between Singapore and Lonjigar, and an altitude of 1,603 feet (at Tirmui) has to be overcome.

13. The route from Ryaguddah *via* Singapore, the Músa Ghát, Bondesor and Dádpúr to Bôgor, has been carefully examined and must be considered objectionable for a railway, owing to the Músa Ghát, the head of which is 2,048 feet above mean sea level; while, by taking the route *via* Bisemkattak and Ombadóla, this ghát can be avoided.

14. The route mentioned\* by Colonel Lucie-Smith, *viz.*, from the Músa

\* *Vide* G. O. No. 3025W., dated 5th December 1881. Ghát *via* Nandól, Daspúr and Lorka, to Polsodár on the Sunder river (where it would meet my line from Kariál to Kúmúna), naturally shares the fate

of the Músa Ghát, and must be rejected for the purposes of the railway if the ghát is rejected. But, with a view to opening out that part of the country, an ordinary cart-road should be made along Colonel Lucie-Smith's line, as well as from the Músa Ghát southwards *via* Singapore to Ryaguddah. This road would serve as a feeder to the railway if the latter is taken along the eastern, or Ombadóla route.

15. Similarly, the line recommended from Torbor (where it leaves my line) *via* Limdi, Tárnó, Sárabong, Tendubarra, Sirgidi, Bodrabanda, Kamaría and Kárti to Mahásamund (where it joins mine again), although a very good one for an ordinary road, has this drawback for a railway, that the line encounters two small gháts (near Tárnó and Sirgidi) with an elevation of upwards of 1,500 feet; while the route *via* Jalbal, Nára and Súarmál, which is very little longer, meets no such obstacles; and its summit level is about 400 feet lower.

This subject has been reported on in my letter No. 24R., dated Raipúr, 6th January 1882, paragraphs 9 to 11.

16. The line from Raipúr *via* Dhamtari and Kankér to Omorkót, or Rairgarh, is 13 miles longer than that *via* Rájim, along the Pairi river, through the Bindra-Noagarh Estate, and then up the Sorul or Sondor river. It would no doubt be desirable to take the rail *via* Dhamtari, which is situated in the very heart of a rich grain-producing country. But, besides being a long one, this line would encounter some difficult ghát work in the Hatkul valley, south-east of Kankér; while the grain country is also tapped by the Rájim line, although not to the same extent as it would be *via* Dhamtari.

This line has been discussed in my letter No. 38K., dated Kuraputi, 25th February 1882, paragraphs 10 and 11.

17. The lines examined and reported on by Colonel Francis, between Dhamtari, Sihoa and Borai, must be considered, on account of the hilly nature and irregular configuration of the country, as not eligible for the purposes of a Railway, when there are other and better lines. But the easiest of that officer's route (that *viā* Kukrél, Dókál, Gatásili and Burgudi) should be opened as an ordinary cart-road; when it would act as a feeder to the Railway.

I have submitted a copy of Colonel Francis' report, with my letter No. 38K., dated 25th February 1882, paragraph 17.

18. Altogether, the reconnoitring party has travelled upwards of 1,100 miles, as specified in the margin.\*

	MILES.
* Vizagapatam to Raipur <i>viā</i> Párvatipuram and Ombaddóia	372
Raipur to Vizagapatam <i>viā</i> Kuraputi	356
Ryaguddah <i>viā</i> Músa Ghát and Bondesor to Bógor	100
Raipur <i>viā</i> Dhamtari and Kankér to Omor-kót	150
Nárangpúr to Maribatta	50
Pupagón <i>viā</i> Jeypur to Kuraputi	24
Jalbal to Onki and back	50
Singapore <i>viā</i> Lonjigár to Ombaddóia and back	40
TOTAL	<u>1,142</u>

G. O. No. 2294W., dated 16th September 1881 (paragraph 9) requires the longitudinal section of one line only; but, as I collected all the necessary material in the shape of measurements, observations, field notes, &c., I have submitted sections of nearly all the lines examined (with cross sections of streams); so that there are now before Government longitudinal sections of 900 miles of the country traversed, with the

heights determined by the aneroid at about 900 places which are, on an average, a mile apart.

19. The perambulators used were by Elliot Brothers, of London.

The party was supplied with 11 aneroids, *viz.*, 5 by E. J. Dent, 3 by T. Cooke and Sons, 2 by L. Casella, and 1 by Negretti and Zambra; which were compared, and set, at the Public Works Stores in Madras, before being despatched. Of these, six that read best together were formed into two batteries of three each; one battery being kept and observed by the Master Attendant at Vizagapatam, while the other was registered in camp by myself daily at 11 A.M. and 4 P.M.

The other aneroids were carried about on the march and registered at every mile, at every stream, and at every change of level in the ground.

For calculating the altitudes, the hypsometrical tables of Major Morant, R.E., were used.

20. I cannot close this report without bringing to the special notice of Government the good services of my Assistant, Mr. J. Cormac, Sub-Engineer, who throughout the whole expedition has shown the most praiseworthy zeal, has been indefatigable in the discharge of his duties, and rendered me very valuable assistance; combining, as he did, great intelligence with arduous work and perseverance under difficulties. Two hundred and fifty miles of the country explored were reconnoitred by him alone, and I have submitted his own original notes and reports on these. I should be glad if the Government would acknowledge his good services by granting him a step in promotion, namely, from the 2nd to the 1st grade of Sub-Engineers.

21. I enclose an Appendix (1 A), containing a description of the preparations for the expedition, which Appendix I beg may be placed at the head of such of my papers as are to be printed in connection with the Reconnaissance.

22. The tents, stores, instruments, &c., have been handed over to the Executive Engineer, Vizagapatam Division, in accordance with memorandum No. 567C., dated 8th March 1882, from the Chief Engineer.

### XXIII.

*Notes of Reconnaissance of the Eastern Gháts from Kuraputi to Sálur, 6th to 16th March 1882.*

*6th March, Kuraputi to Chikapár.*—Having finished the report on the reconnaissance from Raipur to Kuraputi, and the sections appertaining thereto,

the survey party left Kuraputi on the 6th March 1882 to undertake the last portion of the work, namely, across the Jeypur plateau and down the Eastern Ghâts to Sâlûr.

From Kuraputi I first proceeded to *Mastiput*, a distance of  $3\frac{1}{2}$  miles, and took up the proposed Railway line there, where I had ceased work on the 16th of February. *Mastiput* is 214 miles from Raipur.

The aneroid battery, which had been of no use at Kuraputi, here began to work again, *Mastiput* being 2,520 feet above mean sea level. The aneroids in the battery, being figured only up to 27.50, could not be registered at an elevation exceeding 2,500 feet.

Marching from *Mastiput* towards *Dumripur*, a stream was crossed at the 2nd furlong, measuring 25 feet  $\times$  6 feet, in flood. At 1 mile 1 furlong is the village of *Dengagura*, which is conveniently situated for the future Kuraputi Railway station : a valley leading from here to Kuraputi, along which a hill-side road could be easily and cheaply made to connect the two places which are  $2\frac{1}{2}$  miles apart.

The track proceeds along the bank of the *Kuradi nullah* ; there is some low scrub jungle about ; the soil is hard and light.—Low hills on the left.

At 1 mile 2 furlongs a *stream*, 25 feet  $\times$  8 feet.

The ground then becomes somewhat irregular, and some cutting and embanking will be required.

At 2 miles 5 furlongs a small stream, 8 feet  $\times$  5 feet ; the ground is hilly and irregular, and rather stony.

At 2 miles 6 furlongs the *Kuradi nullah* (25 feet  $\times$  8 feet) is crossed again by the track ; there is some hilly jungle about ; no cultivation.

The hill side is stony, occasionally rocky ; the soil brown clay mixed with sand.

There is a rise from *Mastiput* up to this of 150 feet or 1 in 97.

The road about here would be mostly in hill-side cutting, and some rock blasting required, but not much.

In the 4th mile a *stream* is crossed, 15 feet  $\times$  5 feet.

At 3 miles 6 furlongs the track leads over a *saddle*, 360 feet above the starting point.

The soil is light clay, rather stony.

At 4 miles a *stream*, 25 feet  $\times$  9 feet ; then another, 18 feet  $\times$  7 feet.

At the 5th mile there is some dry cultivation ; no jungle.—Soil brown clay.

Before joining the high road from Kuraputi to Potingi, the village of *Nigamangura* is reached, where there are some paddy-fields. A stream, 25 feet  $\times$  7 feet, is crossed ; and at 5 miles 6 furlongs the high road is joined.

The village of *Dumripur* was passed, and at 6 miles 7 furlongs the *Karandi stream* was reached, 30 feet  $\times$  9 feet, with soft clayey banks and muddy bed.

Then another stream, 14 feet  $\times$  5 feet.

At 7 miles 7 furlongs 143 yards the day's work was brought to a close, to be resumed to-morrow.

The party at this point left the high road to proceed to the site of the old Chikapár bungalow where the camp had been pitched.

As regards the fitness for a Railway of the line traversed to-day from *Mastiput* to Chikapár bridge, distance 8 miles, the section shows that, up to 1 mile 1 furlong 92 yards, the maximum gradient required would be 1 in 155 ; thence to 2 miles 6 furlongs 47 yards, 1 in 76 ; and up to the saddle, 1 in 25.\*—From the saddle, by which the line enters on the Jeypur plateau (averaging 3,000 feet in elevation), there is a gentle descent

of 101 feet in 4 miles 1 furlong and 90 yards. This descent includes some undulating ground which has to be negotiated in detail ; but there is nothing serious in the way of cutting or embanking required, and a good line could be easily laid out.

7th March, Chikapár to Doliamb.—Distance 9 miles 3 furlongs.

We joined the public road where work was left off yesterday, and marched towards Potingi.

At the 2nd furlong the *Karandi stream* was crossed, over which there is a temporary timber bridge. The banks of the stream are steep and soft, the soil

\* Or, an average gradient of 1 in 55 ; but, by taking the line from Rângâr above *Mastiput*, this gradient could be considerably eased.

is tenacious clay, the bed sandy and muddy alternately; there is no visible rock near for foundations.

Some dry cultivation along the route; no jungle.

At 2 miles 7 furlongs the road passes over a *saddle* not far from the village of *Kakkigám*.

A drainage channel 12 feet  $\times$  4 feet is crossed.

The prevailing soil is stiff clay.

At 4 miles 5 furlongs the old Police station at *Semligura* was passed.

At 5 miles 7 furlongs a *stream*, 30 feet  $\times$  8 feet, with steep, soft banks and sandy bed; no rock near for foundations.

Some wet and dry cultivation; no jungle. The soil here is brown clay; some laterite rock occurs near the road, a few feet below the surface.

7 miles 70 yards; *stream* 24 feet  $\times$  8 feet, with steep, clayey banks. Some light scrub jungle.

At 8 miles 6 furlongs, the village of *Márliput* was passed.

At 9 miles 143 yards a *stream*, 45 feet  $\times$  7 feet; bed, clay and shingle; soil, red clay; some laterite; the banks are sloping; the bed during floods is large and well defined; there is a distinct channel in the centre where the water at present runs about 4 feet deep.

At 9 miles 3 furlongs the camp near *Dóliámb* was reached, where there is both wet and dry cultivation. Jungle on the hill side.

To-day's march lay entirely along the 3,000 feet plateau; the ground undulates considerably; but a good and easy line for the Railway can be obtained by keeping along the low ground as much as possible, and generally following the course of the longitudinal valleys leading in the direction of the proposed line.

Some high embankments would be required, but not much cutting. The soil is easy, the drainage to be crossed moderate, and there is not much rock.

8th March, *Dóliámb* to *Dókriagát Saddle*, 11 miles 4 furlongs. *Dókriagát* Saddle to *Merialpád* camp, 7 miles 6 furlongs. Total distance 19 miles 2 furlongs.—Continued along the public road for some distance from *Dóliámb*.

At 1 mile 4 furlongs 187 yards a *stream* was crossed, 25 feet  $\times$  10 feet, with steep clayey banks; bed, sand with shingle.

Some dry cultivation.

Prevailing soil, stiff clay.

Here we left the road and marched towards the village of *Kundili*, at the third mile, where ample wet cultivation was seen.

Beyond the village, the track passed over a tank bund.

At 3 miles 5 furlongs, a *stream* flowing into the *Koláb* was crossed, 35 feet  $\times$  9 feet, with steep clayey banks, and firm bottom; no rock visible. The ground here is somewhat undulating.

The track follows the course of the river just crossed; there are hills on both sides; the slopes are cultivated.

At 4 miles 5 furlongs the village of *Temba* was passed; *Dusra* was left on the right, on the other side of the stream. We then passed along a narrow valley where some hill-side cutting for the road would be required.

The main path leading from *Pottingi* to *Nandapur* was met.

At 5 miles 5 furlongs a *stream*, 25 feet  $\times$  8 feet, flowing into the stream last crossed.

At 5 miles 8 furlongs, the village of *Kirajóla Dusra* was reached. Here are some dry fields, chiefly with ragi; and some gardens with castor-oil and plantain trees. Hills and jungle around.—In the 7th mile the last-mentioned stream was again met, and then its course followed up along the narrow valley, where some hill-side cutting would be required for the road.—Much dry cultivation around.

7 miles, 4 furlongs.—Near the village of *Déo Pottingi*; at least one of the villages of that name: there are several.

We passed between *Déo Pottingi* and *Sargigura*.

At the 9th mile the last stream was crossed once more. The soil here is red clay. There is some dry cultivation. Thin scrub jungle and stunted date grow all around. Some hill-side cutting for the road required.

At 9 miles 6 furlongs, passed through another *Déo Potingi* which seems to be the chief of the several villages of that name about here.

Then the path led through a *gorge*, where much hill-side cutting would be needed.

A small irrigation channel, coming from the head of the gorge (the Dókri-gát Saddle) and flowing towards *Déo Potingi*, is led along the hill-side.

Beyond the gorge there is some flat ground again, breaking into irregular features here and there.

*At 11 miles 4 furlongs*, we arrived in the *Dókri-gát Saddle*, having come at a steady ascent (about 300 feet) all the way from the village of *Kundili*.

The height of this saddle above mean sea level is 3,190 feet.

The track through the saddle is a short cut from *Kundili* to *Merialpád*; the easier but somewhat longer route lies along the valley of the *Koláb* river, further west.

From *Dókri-gát Saddle* the lower ground to the south is overlooked wherein the village of *Pukeli* lies, to which the track descends rapidly from the saddle. But a gradual descent on an easy gradient can be obtained by keeping along the hill-side to the east, instead of descending at once.

Having no topographical maps of this part of the country, on the scale of one mile to the inch, and the ordnance map being incomplete for these parts, *as it does not show the hills* (the chief feature here), I had under-estimated the distance from *Dóliámb* to *Merialpád*, and sent the camp ahead to the latter place, along the main road *viá Potingi* and then down the new ghát. So that from *Dókri-gát Saddle* (which I left at 11 A.M.) I had to march across country, over hill and dale, through the jungle, to *Merialpád*.

We marched along the hill-side, passed through the *village of Sangam-gura*, and at the 13th mile got into another *saddle* connected with the last by a ridge, and about 90 feet lower.

At last we reached the camp at *Merialpád* at 2-30 P.M., the thermometer in the aneroid box showing 105° F.; having marched 21 miles since 6 A.M., taking observations, notes, &c., and never halted.

*Merialpád* is near the edge of the 3,000 feet plateau, and is at the natural head of all lines of communication that can be brought up from the *Sálúr* plains to the plateau, in this direction.

The *Merialpád Saddle*, 3,250 feet above mean sea level, a mile to the west of the village, is the natural ghát head for all ghát lines converging here.

If it should be decided to take the Railway over the *Jeypur* plateau, there is nothing, encountered in this day's march, to form any obstacle or difficulty. No gradients steeper than 1 in 70 need be used; the amount of hill-side cutting required is by no means formidable, while scarcely any rock is met.

*9th March, Potingi*.—Inspected the new ghát, as far as *Potingi*, and confirmed my previous impression based upon careful examination of the country, some years ago, that this portion of the line should not be used for the Railway; the proper ghát head being at *Merialpád* and not at *High Hadmári*. Indeed, if *Potingi* had not been, chiefly with reference to Mr. Turner's *Taudevalsah* Ghát, made an obligatory point, nine years ago, when the new ghát was traced by me, this ghát would have entered upon the plateau at *Merialpád*, and not at *Hadmári* or *Potingi*. Thus the new ghát would have been 4 miles shorter than it is at present, and its head 250 feet lower.

It is a matter for consideration whether it is, even now, too late to change the upper part of the new ghát by abandoning that portion north of the *Merialpád* cutting (where the shaft was sunk), tracing thence into the *Merialpád* Saddle, taking the road from that to *Pukeli*; and thence either *viá Dókri-gát Saddle* and *Déo Potingi*, or else along the valley of the *Koláb*, towards *Kundili*, near which village the main road to *Kuraputi* would be joined. This would do away with *Potingi* as a station on the main road; the fertile *Koláb* valley would be opened out; and *Pootapád*, *Pukeli* and *Kundili* would then become important points on the new road.

*10th March, Merialpád to Dókri-gát Saddle*.—This march was undertaken to obtain a complete longitudinal section of the line between the *Merialpád* and *Dókri-gát* Saddles, which are nearly on the same level.

We first worked into the Merialpád Saddle, which is  $2\frac{1}{2}$  miles from the camp, and 3,250 feet above mean sea level.

From this saddle to Dókriegát Saddle (3,190 feet above mean sea level) the distance is 7 miles 6 furlongs. At 1 mile 1 furlong, we arrived opposite the village of *Sanduka*, which is on the other side of the valley. The track leads along the hill-side on the left; the soil is light; there is no rock visible. Some dry cultivation, and a little jungle. The ground is alternately flat and side-lying; hill-side cutting would be required in places.

At 1 mile 7 furlongs, a small *nullah* was crossed, 10 feet  $\times$  4 feet; 160 yards further another *nullah*, 15 feet  $\times$  4 feet. Here the track changes from the left to the right side of the valley. Patches of jungle and dry cultivation occur alternately.

At 2 miles 5 furlongs the last *stream* is crossed again, and the track changes back to the left side of the valley.

The ground here is rather irregular.

At 3 miles 5 furlongs a small *nullah*, 12 feet  $\times$  4 feet. Hilly jungle.—Soil, brown clay.

The longitudinal section here shows a considerable dip, because the track descends unnecessarily low; the road would avoid this dip by crossing the valley somewhat higher up.

At the 4th mile the track passes through the *Pukeli Saddle*, and then descends towards the village of *Pukeli*. But the saddle can be circumvented by following the course of the *nullah* last crossed.

We passed a small hamlet belonging to *Pukeli*, and called *Pukeliguda*, situated on a gently sloping hill-side.

There is some dry cultivation near this village.

At 5 miles 6 furlongs the village of *Pukeli* was passed *en route* to the *Dókriegát Saddle*. There is extensive wet and dry cultivation near the village. Half-a-mile north of *Pukeli* a stream is crossed, flowing into the *Koláb* river.

From here the line may either follow the course of the *Koláb* river to *Kundili*, or be taken up into the *Dókriegát Saddle*; but the former is the easier line for a railway. In case the road is taken through *Dókriegát Saddle*, the ridge on the eastern side will take the line from the saddle down towards *Pukeli* at a maximum gradient of 1 in 70.

From *Dókriegát Saddle* we returned to *Pukeli*, a distance of 2 miles, where the camp had been pitched.

The distance marched to-day was as follows:—

		M.	F.	Y.
Merialpád Camp to Merialpád Saddle	.	.	2	4 0
Merialpád Saddle to Dókriegát Saddle	.	.	7	6 92
Dókriegát Saddle to Pukeli Camp	.	.	2	0 42
		TOTAL	12	2 134

The march to-day was chiefly through a broad valley; some intricate ground was passed over near *Pukeli*, but nothing was encountered that could be considered a serious obstacle to tracing a suitable line for a railway.

11th March. *Pukeli to Merialpád via Pútapár*.—Distance 9 miles 6 furlongs.

We marched back from *Pukeli* to *Merialpád Saddle* along the route described yesterday.

From *Merialpád Saddle* we followed the *Brinjarri* track leading into the old and new ghâts between *Lávidy* and *Pútapár*. The track is an easy one and leads chiefly along a gently sloping hill-side.

The railway should descend the hill-side at 1 in 75 from *Merialpád Saddle*, keep above the present ghât and above *Lávidy Saddle*, pass *Chandká* and enter the valley of the *Súnki* river not far from *Páta Lávidy*. It would then cross the *Súnki* valley, as high up the stream as may be found convenient, and proceed along the southern slope of the valley into the *Páchipenta Saddle*, *i. e.*, the head of the old *Páchipenta* ghât, south of the *Súnki* stream.

Or, another line could be run as follows:—

From Merialpád Saddle into the Bittra valley; then through a cutting, to be made in the low ridge near Volagah; along well-wooded hill-sides into Lávidy Saddle; thence either *viā* High Súnpipenta, or *viā* Lávidy and Chandka, into the Súnki valley; across the Súnki stream, and into Páchipenta Saddle, as before.

From Páchipenta Saddle, which is 2,213 feet above mean sea level, there is a descent of 1,443 feet to accomplish, and there is a length of 14 miles of hill-side available to get to the foot of the hills (4 miles north-west of Sálúr); so that a line could be traced at a gradient of 1 in 50, which gives a fall of 105 feet per mile. Much heavy rock would be encountered on these last 14 miles, and a number of large stone revetments would have to be built.

The work on the plateau, *i.e.*, above Páchipenta Saddle, would be rather easy compared to that on these 14 miles; the outer (southern) face of the ridge being very stony.

From the foot of the hills an easy descent of 1 in 100, for 4 miles, takes the line into Sálúr, which is 569 feet above mean sea level, 100 feet above Rámbhadrapúram, and 175 feet higher than Párvatipuram.

*12th March, Bittra Valley line.*—Went to reconnoitre the Bittra valley and to refresh my memory about its features which I had very carefully examined in 1873, 1874 and 1875.

The submit level of this line is also the Merialpád Saddle. The road can be taken down from that saddle, along easy hill-sides, by a gradient of 1 in 50 to the site of the proposed viaduct, 1,500 feet long, 1,622 feet above mean sea level, and 150 feet above the bed of the Wondranghy stream; there we should have to pierce the Ródavalsa ridge by a tunnel 2,000 feet long, and emerge on the southern face of the ridge at the same elevation, *i.e.*, 1,622 feet above mean sea level, or 852 feet above the foot of the hills (which is 4 miles north-west of Sálúr). To accomplish this descent at a gradient of 1 in 50, would require a length of about 8 miles which is available on the same hill-side along which the new Potingi Ghât is being made, and along which the railway from Páchipenta Saddle would come down.

As in the case of the latter, so also here, a considerable amount of rock would have to be blasted, and a number of heavy stone revetments to be built, on these 8 miles.

*13th March, Merialpád to Dóbata.*—Went along the new ghât, as far as Lávidy Saddle; thence along the cattle track leading to Lávidy, Chandka, and Súnki. Passed the village of Páta Lávidy. Then entered the valley of the Súnki stream, followed its course downwards to Súnki, and returned by the old ghât to High Súnpipenta, and thence by the new ghât to the camp at Dóbata, just under Lávidy Saddle.

*14th March, Dóbata to Súnki.*—Proceeded along the new ghât to Súnki, crossed the Súnki stream (which contained very little water) and ascended the old ghât to its summit level on this side (Páchipenta Saddle). Fixed the height of the latter (2,213 feet), and explored the hill-side with a view to the location of the line of rail, in case it should be decided to bring the line here.—Then returned to the camp at Súnki.

*15th March, Súnki to Ródavalsa.*—Marched along the new ghât, as far as the cutting on Ródavalsa Saddle.

Thence descended the steep hill-side into the rocky bed of the Wondranghy stream, and examined the sites of the proposed viaduct and tunnel.

Fixed altitudes, &c., and then returned to the camp on Ródavalsa Saddle, which saddle is 2,001 feet above mean sea level.

*16th March, Ródavalsa to Sálúr.*—Went along the new ghât to the foot, and then along the new line of road being constructed from the foot to Sálúr. There I closed the field work of the last section of the Reconnaissance.

#### *Résumé.*

As the result of my exploration of the ghâts, on this occasion as well as in previous years, I have arrived at the conclusion that the routes above mentioned (*vide* notes for 11th and 12th March), and described as accurately as they can be without actual levels, &c., having been taken, represent the short-

est and most practicable lines (subject to modification in details) that can be found for a railway ghât from Sálúr to the Jeypur plateau. Other lines may be possible, but those here specified offer a minimum of obstacles and difficulties.

These routes are :—

*I.—The Lávidy and Súnki Line.*

(a) From Merialpád Saddle to Páchipenta Saddle *viâ* Chandka and Súnki valley.

Miles.	
15	Fall 1,037 feet; gradient 1 in 75; length 15 miles (Section No. 6).
14	
4	
—	
33	From Páchipenta Saddle to foot (4 miles north-west of Sálúr). Fall 1,443 feet; gradient 1 in 50; length 14 miles (Section No. 10).
—	

From foot to Sálúr. Fall 200 feet; gradient 1 in 100; length 4 miles (Section No. 15), total 33 miles.

(b) Or, from Merialpád Saddle to Merialpád cutting (on the new Potingi Ghât).

Miles.	
2 $\frac{1}{2}$	Fall 143 feet; distance 2 $\frac{1}{2}$ miles; gradient 1 in 92 (Section No. 11).
7 $\frac{1}{2}$	
2 $\frac{1}{2}$	
5 $\frac{1}{2}$	
14	From Merialpád cutting into the Bittra valley and to Lávidy Saddle. Fall 507 feet; gradient 1 in 75; length 7 $\frac{1}{2}$ miles (Section No. 7).
4	
35 $\frac{7}{10}$	From Lávidy Saddle to High Súnkipenta; fall 106 feet; distance 2 $\frac{1}{2}$ miles; gradient 1 in 125 (Section No. 9).
—	

From High Súnkipenta *viâ* Súnki valley to Páchipenta Saddle; fall 281 feet; gradient 1 in 100; length 5 $\frac{1}{2}$  miles (Section No. 9).

From Páchipenta Saddle to foot; fall 1,443 feet; gradient 1 in 50; length 14 miles (Section No. 10).

Foot to Sálúr; fall 200 feet; gradient 1 in 100; distance 4 miles (Section No. 15).

Total length 36 miles.—This is the longest route of all, and has the easiest gradients.

(c) Or, from Merialpád Saddle *viâ* the Bittra valley to Lávidy Saddle,

Miles.	
9 $\frac{7}{10}$	as before 9 $\frac{7}{10}$ miles (Section No. 7).
5 $\frac{1}{2}$	
18	From Lávidy Saddle <i>viâ</i> Chandka and the head of the Súnki valley to Páchipenta Saddle; fall 387 feet, gradient 1 in 75; length 5 $\frac{1}{2}$ miles.
33 $\frac{7}{10}$	Páchipenta Saddle to Sálúr, as before, 18 miles; total length 33 $\frac{7}{10}$ miles.
—	

*II.—The Bittri Valley Line, with Viaduct and Tunnel.*

(d) From Merialpád Saddle to Merialpád cutting, as before; distance 2 $\frac{1}{2}$  miles. From Merialpád cutting to Wondranghy stream; roadway of viaduct 150 feet above bed. Fall 1,485 feet; gradient 1 in 50; length 14 miles (Section No. 11).

Miles.	
2 $\frac{1}{2}$	Wondranghy Viaduct, and Ródavalsa Tunnel; combined length 3,500 feet (Section No. 16).
14	
$\frac{8}{9}$	
4	
—	
29 $\frac{1}{2}$	From south entrance of tunnel, to foot (4 miles north-west of Sálúr); fall 852 feet, gradient 1 in 50; length 8 $\frac{1}{9}$ miles (Section No. 13).
—	

From foot to Sálúr; fall 200 feet; gradient 1 in 100; length 4 miles; total length 29 $\frac{1}{2}$  miles (Section No. 15).

(e) Or, from Merialpád Saddle to Merialpád cutting, as before; distance 2 $\frac{1}{2}$  miles. From Merialpád cutting to viaduct, at a gradient of 1 in 35; length 10 miles (Section No. 13). Viaduct and tunnel, as before,

$\frac{2}{3}$	$\frac{2}{3}$ mile. Tunnel to foot, at 1 in 35; 5 $\frac{7}{8}$ miles; foot to Sálúr, 4 miles; total 23 miles.
10	
$\frac{2}{3}$	
5 $\frac{1}{2}$	
4	
—	
23	This is the shortest practicable line, and is shorter than the new Potingi Ghât which is now being made.
—	

The steep gradient may be considered objectionable for a railway; but railways on similar gradients have been made in other parts, for instance over the Alps (the Semmering Pass in Austria, and the Brenner Pass in Bavaria); over the Western Ghâts near Bombay (the Bhore and Thull Ghâts); and others.

K. F. NORDMANN,

### *Executive Engineer.*

WALTAIR,  
18th April 1882.

XXIV.

*Statement of Particulars describing Mr. Nordmann's Route—from Párvatipuram to Raipur.*

Distance from Vizagapatam.	Distance between principal stations.	Distance between Villages.	Height above M.S.L.	Rise.	Fall.	REMARKS.	
						M.	F.
M. 85	F. 7	Y. 4	M. ...	F. 395' 3	Y. ...	...	Belagamparvatipuram.
			1 1 63	360' 0	...	...	Town of <i>Párvatipuram</i> .
			2 3 137	385' 0	...	...	Sandy loam kunkur underlying.
			3 3 147	385' 0	...	...	Village of <i>Vikrumapuram</i> . Dry cultivation.
			4 3 150	340' 0	...	...	Junction with <i>Kurupam</i> road. Wet and dry cultivation.
			5 4 143	318' 0	...	...	Dry cultivation.
			6 3 182	310' 0	...	...	Village of <i>Jungalavalasa</i> .
			6 6 176	...	...	...	<i>Narrainpatnam</i> . River, Section No. 1. Village of <i>Kotapam</i> .
			7 7 173	275' 0	...	...	Stream 20' x 4'.
			9 1 23	...	...	...	Do. 10' x 4'.
			10 0 120	...	...	...	Village of <i>Komarada</i> . Station-house.
			10 3 86	280' 45	...	114' 85	Cultivation under tank.
			1 1 87	270' 0	...	...	Stream 20' x 6'.
			2 1 92	280' 0	...	...	Jungle.
			3 2 46	340' 0	...	...	Wet cultivation. Jungle.
			4 4 163	260' 0	...	...	Undulating irregular ground. Sandy clay.
			4 7 133	...	...	...	Little cultivation.
			5 6 81	260' 0	...	...	Stream 10' x 4'.
			6 6 141	340' 0	...	...	Do. Section No. 2.
			8 0 184	360' 0	...	...	Do. do. No. 3. Oil-seeds and sugar-cane.
			9 2 68	403' 0	...	...	Sandy soil.
			9 4 48	...	...	...	Stream 4' x 3'. Wet and dry cultivation, and jungle. Ground broken and undulating.
			10 4 129	483' 8	203' 35	...	...
			1 2 55	513' 8	...	...	Stream, Section No. 4.
			2 7 46	433' 0	...	...	Village of <i>Jummadahpettah</i> .
			2 7 77	...	...	...	Jungle and dry cultivation.
			3 3 80	420' 0	...	...	Stream 15' x 7'.
			4 1 185	420' 0	...	...	Do. 15' x 10'.
			4 2 0	...	...	...	Do. Section 5.
			5 1 50	470' 0	...	...	Road runs by river Nagayully.
			5 7 17	483' 0	...	...	Stream, Section No. 6. Jungle with little cultivation in patches.
			7 3 158	568' 0	...	...	Khond Village of <i>Juddah</i> . Dry cultivation.
			9 1 215	540' 0	...	...	Dry cultivation, Light sandy soil.
			9 7 1	687' 0	204'	...	Village of <i>Pittannmoley</i> . Light sandy soil.
			1 4 30	669' 0	...	...	River, Section No. 7.
			2 4 37	637' 0	...	...	Village of <i>Kulliagoodah</i> . Ground somewhat broken. Stream 6' x 4'.
			3 7 79	657' 0	...	...	Village of <i>Prodiguda</i> . Tope for camping.
			5 4 187	617' 0	...	...	Dry cultivation; some wet.
			6 6 104	667' 0	...	...	Village of <i>Comellypettah</i> . River, Section No. 8. Level upland country.
			8 1 189	709' 0	22'	...	Some jungle. Village of <i>Jugganaidupetta</i> .
			8 6 147	736' 0	49'	...	Village of <i>Gingerabadi</i> . Soil dark brown clay, nearly black.
						...	<i>Gingerabadi</i> . Ground becoming more uneven. A good deal of jungle. Jungle and cultivation; some wet cultivation under streams. Soil alternately sandy and clayey loam.

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*Statement of Particulars describing Mr. Nordmann's Route, &c. —contd.*

Distance from Vizagapatam.	Distance between principal Stations.	Distance between Villages.	Height above M.S.L.	Rise.	Fall.	REMARKS.
M. F. Y.	M. F. Y.	M. F. Y.				
		1 3 142	764'0	...	...	Dry cultivation. Jungle and patches of cultivation. Rock.
		3 1 60	778'0	...	...	Dry cultivation. Sandy soil.
		3 3 110	706'0	...	...	Stream, Section No. 9. This river lies in a deep valley.
		4 3 126	778'0	...	...	Village of <i>Gujelpadu</i> . Dry and wet cultivation. Ground somewhat undulating. Small planted tupe of young trees. Village of <i>Sunta-Bunnigaum</i> . Sandy track; slightly undulating.
		6 0 118	794'0	...	...	.....
		6 4 74	766'0	...	...	Stream, Section No. 10. Jungle and cultivation. Sandy track. Village of <i>Buthpuram</i> .
		7 6 76	876'0	...	...	Stream, Section No. 11. Hilly jungle. Broken ground. No cultivation.
		8 6 44	904'0	...	...	Jungle with patches of cultivation.
		10 0 27	1,072'0	...	...	<i>Balligiy</i> .
		10 4 123	1,136'0	400'	...	Hill side cultivated in patches.
		1 5 92	1,206'0	...	...	Very few patches of cultivation.
		2 6 48	1,236'0	...	...	Stream, Section No. 12.
		3 2 176	1,196'0	...	...	Do. 10' × 15'.
		4 0 91	1,286'0	...	...	Ground uneven, cut up by gullies.
		4 2 175	1,258'0	...	...	Soil, sandy brown clay. Bifurcation of roads eastern to <i>Bissemkattak</i> , western to <i>Raipur</i> via <i>Tikirapara</i> .
		4 6 104	1,298'0	...	...	Jungle and patches of cultivation. Reddish sandy clay. Jungle, with little cultivation.
		5 3 147	1,346'0	...	...	Village of <i>Matakeri</i> . Wet and dry cultivation.
		6 4 109	1,276'0	...	...	Village of <i>Batuguda</i> . Dry cultivation and jungle.
		7 5 147	1,176'0	...	...	Jungle, with recent clearing and sparse dry cultivation.
		9 0 69	1,156'0	...	...	<i>Bissemkattak</i> in the midst of hills and jungle. Paddy-fields. Stream, Section No. 13.
146	3 187	29 4 191	10 1 141	1,154'0	18'	Jungle.
		2 1 98	1,194'0	...	...	Stream 10' × 5'. Some dry cultivation.
		3 3 134	1,104'0	...	...	Village of <i>Goilkana</i> . Stream 25' × 5'. Some wet cultivation. Village of <i>Lur-chigada</i> . Extensive wet cultivation.
		5 3 142	1,054'0	...	...	Dry cultivation in jungle. Village of <i>Depaguda</i> . Extensive wet cultivation. Stream 25' × 5'. Village of <i>Dandra</i> . Jungle; few patches of clearing.
		7 2 208	1,104'0	...	...	Village of <i>Tikirapara</i> . Wet and dry cultivation. Stream, Section No. 14.
		8 4 16	1,104'0	...	...	Jungle. Dry cultivation. Village of <i>Jomaraguda</i> . Village of <i>Chellanalla</i> . Fine tupe for camping
		9 4 173	1,094'0	...	...	Stream 10' × 5'. Jungle cleared here and there. Dry cultivation.
		11 1 204	1,194'0	...	...	<i>Kordaband</i> . Fine tupe for camp. Stream 10' × 5'; stream 10' × 5'.
		12 0 67	1,192'7	38'	...	Jungle and dry cultivation. Stream 10' × 5'.
		1 3 75	1,100'0	...	...	Village of <i>Doikal</i> . Stream, Section No. 15. Paddy and dry cultivation, sugar-cane.
		3 1 211	1,050'0	...	...	Village of <i>Kondugura</i> . Stream 25' × 5'. Undulating country. Hills on both sides. Tree, jungle, patches of dry cultivation.
		3 7 82	...	...	...	Village of <i>Sivapodro</i> and <i>Dombisi</i> . Small ghāt stream 15' × 5'; stream 8' × 3'.
		5 2 191	1,070'0	...	...	Hilly undulating ground. Jungle and dry cultivation.
		6 6 187	1,060'0	...	...	Stream, Section No. 16. Dense jungle. Hill side cutting required. Flat country.
		7 2 47	...	...	...	Village of <i>Chankuti</i> .
		8 5 27	1,182'0	...	...	Village of <i>Peddagudah</i> . Village of <i>Ramguda</i> .
		9 3 17	1,152'0	...	...	

## Statement of Particulars describing Mr. Nordmann's Route, &amp;c. —contd.

Distance from Vizagapatam.	Distance between principal Stations.	Distance between Villages.	Height above M.S.L.	Rise.	Fall.	REMARKS.
M. F. Y.	M. F. Y.	M. F. Y.	Feet.	Feet.	Feet.	
170 3 52	23 7 85	10 0 67 11 7 18 0 5 0	1,082' 0 1,196' 0 1,234' 0	... 4' 0 ... ...	... ...	Bongsdara River, Section No. 17. Fine tope for camping; Ombadola. Stream, Section No. 18. Planted topes alternating with jungle and dry cultivation.
		1 7 78	1,234' 0	...	...	Village of Kumralab. Stream 10' x 4'. Village of Bijapuram. Jungle and dry cultivation.
		2 7 0	...	...	...	Village of Ishapur. Jungle with a little dry cultivation.
		3 5 153	1,296' 0	...	...	Summit stream 6' x 4'.
		4 2 0	...	...	...	Village of Banpur. Gneiss rock with quartz jungle.
		4 5 197	1,166' 0	...	...	Stream, Section No. 19. Broken ground; stony soil; soil clay with kunkur.
		5 3 26	1,136' 0	...	...	Jungle and rock cropping out. Irregular ground broken and undulating. Stream 6' x 4'.
		7 0 176	1,076' 0	...	...	Village of Boreguda. Dry cultivation in the midst of jungle.
		8 1 121	1,066' 0	...	...	Village of { Denger Kargati }. Dry cultivation, surrounded by jungle. Ground undulating and cut up by gullies. Soil red clay.
		9 2 21	996' 0	...	...	Boundary of Kalahundy. Tracks to Longjigar and Bondesor diverge at this point. Dense jungle; stony soil. Village of Sigriguppa. Forest of large trees.
		10 3 0	...	...	...	Stream 20' x 5'; stream 10' by 5'. Abundance of kunkur, limestone about.
		11 0 50	...	...	...	Stream 25' x 6'. Jungle. No cultivation.
182 1 0	...	11 5 176	927' 0	...	269'	Sorigura. Small clearing in dense jungle. Dense forest of good timber trees; matti abundant; ample timber for railway sleepers. Virgin soil.
		1 6 117	837' 0	...	...	Stream, Section 20. Virgin jungle and forest without a patch of clearing.
		2 4 169	827' 0	...	...	Village of Padmara. Some dry cultivation. Flat country. Soil, light sandy clay. Village of Foremalla.
		4 1 0	...	...	...	Irrigated land.
		4 7 114	747' 0	...	...	Village of Bakel. Wet and dry cultivation. Village of Olisirka. Wet and dry cultivation. Soil, dark clay.
		6 2 0	727' 0	...	...	Village of Talagaon. Wet and dry cultivation. Open ground round village. Scrub jungle.
		7 3 172	700' 0	...	...	Village of Sorigura. Wet and dry cultivation near village.
		8 1 198	710' 0	...	...	Village of Mandel. Ample cultivation all round. Black soil. Some jungle.
192 7 75	...	10 6 67	699' 3	...	228'	Village of Asurgor, situated in an old mud fort.
		0 1 94	...	...	...	Stream, Section No. 21. Light jungle and dry cultivation. Soil heavy clay, nearly black.
		0 7 194	699' 0	...	...	Village of Borgaon. Open country. Extensive wet and dry cultivation.
		1 4 178	679' 0	...	...	Good soil, nearly black.
		2 0 207	...	...	...	Villages of { Setirpalli Bolaspur }. Young mango topes about five years old. Extensive rice-fields.
		2 6 215	679' 0	...	...	Tank. Jungle; a few patches of wet and dry cultivation. Much rock. Track branches off to Bondesor. Light soil.
		4 0 16	609' 0	...	...	Stream 18' x 9'. Sandy bed; good banks.
		4 5 2	609' 0	...	...	Village of Domsilat. Small village in jungle, with little dry cultivation around.
		5 7 212	589' 0	...	...	Village of Torta. Five huts in a clearing surrounded by jungle.
		6 7 28	549' 0	...	...	Derou stream, Section No. 22.
		8 6 186	549' 0	...	...	Village of Kandel. One dozen huts in a large clearing.
		9 5 3	...	...	...	.....

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*Statement of particulars describing Mr. Nordmann's Route, &c. —contd.*

Distance from Vizagapam.		Distance between principal Stations.	Distance between Villages.	Height above M.S.L.	Rise.	Fall.	REMARKS.
M.	F.	M.	F.	Y.	Feet.	Feet.	Feet.
205 3 128	35 0 76	10 5 168	11 6 9	549'0	...	...	Village of <i>Dammermurra</i> . A few huts in a small clearing. Very little cultivation. Stream 11' × 4'.
		12 4 53	627'7	...	...	71'6	Village of <i>Bogor</i> . Small area of wet cultivation. Dry cultivation. Cross road from <i>Bondesor</i> to <i>Sumbulpoor</i> .
		1 4 193	597'0	...	...	...	Tel Nadi, Section No. 23.
		1 7 93	547'0	...	...	...	Village of <i>Mohda</i> .
		2 7 84	577'0	...	...	...	Soil heavy sandy clay. Wet and dry cultivation. Village of <i>Gontalalli</i> . Slightly undulating. Open park-like country. Light scrub jungle and grass land.
		3 1 78	577'0	...	...	...	Village of <i>Serk</i> . Open country, high and dry ground. Light sandy soil.
		5 1 44	587'0	...	...	...	Stream, Section No. 24. Open grass country. Some cultivation. Village of <i>Udepur</i> .
		6 0 120	560'0	...	...	...	Village of <i>Gurar</i> . Wet and dry cultivation. Much garden cultivation.
		7 2 206	585'0	...	...	...	Village of <i>Boolkapodor</i> .
		8 7 5	618'0	...	...	...	Stream, Section No. 25. Open country. Dry and wet cultivation. Extensive wet cultivation.
214 0 0	...	0 6 140	587'0	...	...	...	Village of <i>Kuland</i> . Extensive cultivation, wet and dry. Some jungle. Undulating ground.
		2 7 116	578'0	...	...	...	Village of <i>Gondergura</i> . Rocky hillocks. Undulating country.
		4 2 171	618'0	...	...	...	Stream, Section No. 26. Village of <i>Daiton</i> . Wet and dry cultivation. Soil dark clay.
		5 2 144	568'0	...	...	...	Village of <i>Itchegao</i> . Open flat country.
		7 4 145	588'0	...	...	...	Village of <i>Porsasora</i> . Good camping ground. Flat open country, slightly undulating.
		9 3 46	608'0	...	...	...	Village of <i>Badbeng</i> . Wet and dry cultivation. Soil sandy clay.
		11 6 200	638'0	...	...	...	Village of <i>Sorman</i> . Open country, well cultivated.
		1 6 11	638'0	...	...	...	Village of <i>Bisapatnam</i> . Dark clayey soil. Well cultivated. Open country. Rock cropping up in places.
		3 7 125	628'0	...	...	...	Village of <i>Saleburut</i> . Extensive cultivation. Good camping ground.
		5 3 124	648'0	...	...	...	Village of <i>Jholop</i> . Wet and dry cultivation. Garden cultivation. Soil gravelly. Tope and camping ground. Quartz, outcrops in several places.
226 2 0	...	6 6 204	676'0	...	...	...	Village of <i>Boslar</i> . Stream, Section No. 27. Good camping ground for an army.
		10 0 139	686'0	48'	...	...	Village of <i>Tukla</i> . Swampy ground.
		1 0 183	686'0	...	...	...	Village of <i>Bisga</i> . Wet and dry cultivation; scrub jungle; swampy ground; scrub jungle.
		2 3 58	686'0	...	...	...	Village of <i>Pokansor</i> . Black soil. Wet and dry cultivation.
		3 5 160	666'0	...	...	...	Village of <i>Boro Doil</i> . Wet and dry cultivation. Rich dark clay.
		5 3 48	752'0	...	...	...	Village of <i>San Doil</i> . Large tank of drinking water. Scrub jungle. Good camping ground.
		7 4 84	802'0	116'	...	...	Village of <i>Karial</i> . Good camping ground. Low scrub jungle. No cultivation.
		2 0 72	772'0	...	...	...	Village of <i>Chindagura</i> . Extensive garden cultivation; some wet and dry cultivation.
		2 4 121	...	...	...	...	Heavy jungle.
		3 4 82	762'0	...	...	...	Village of <i>Tonkpali</i> . A little cultivation; heavy jungle.
243 6 116	38 2 208	5 5 102	762'0	...	...	...	Heavy jungle. Garden cultivation; heavy jungle. Small stream 5' × 5'; stream 20' × 6'.
		7 1 23	730'0	...	...	...	Village of <i>Nuapara</i> . Wet cultivation. Jungle.
		8 0 192	711'0	...	...	...	Village of <i>Borgoan</i> . Light gravelly soil. Stream 15' × 6'; stream 10' × 4'; stream 10' × 4'.

*Statement of particulars describing Mr. Nordmann's Routes, &c.—contd.*

Distance from Vizagapatam.	Distance between principal Stations.	Distance between Villages.	Height above M.S.L.	Rise.	Fall.	REMARKS.
M. F. Y.	M. F. Y.	M. F. Y.				
255 5 153	...	10 5 66 11 7 37	741'0 761'0	...	41.	Village of <i>Kolinga</i> . Jungle. Village of <i>Tikali</i> . A few huts in a clearing in the jungle. Hilly jungle. Stony soil with gravel; much quartz about. Stream, Section o. 28. Village of <i>Lamipani</i> . Wet and dry cultivation. Jungle with stunted teak.
		1 6 112	741'0	...	...	Stream 26'×6'. Rock for foundations; ledges of stratified rock extending across the stream. Stream 6'×4'. Jungle. Rocky and stony ground. Stream 10'×5';
		3 0 65	751'0	...	...	Village of <i>Jalkusum</i> . Rich dark soil. Stream 15'×5'. Rocky bed; high banks. Stream, Section No. 29.
		4 4 128	751'0	...	...	Village of <i>Dumribahal</i> . Wet and dry cultivation.
		5 7 115 6 6 37	741'0 791'0	...	...	Village of <i>Bilinjar</i> . Topes, gardens and fields. Wet and dry cultivation. Jungle. Hilly ground. Dense jungle. Fine camping ground.
		7 5 75	811'0	...	...	Village of <i>Kumuna</i> . Gurmai stream, Section No. 30. Jungle. Dark rich soil. Open country. Grass land.
266 0 0	...	10 3 10 0 7 8	857'0 787'0	96.	...	Village-site of <i>Gursor</i> , deserted. Village of <i>Kisima</i> . Village of <i>Tokopara</i> . Jungle and grass land. No cultivation.
		2 2 121	797'0	...	...	No track. Village of <i>Kurisor</i> . Some wet and dry cultivation.
		3 4 104	787'0	...	...	Rich dark soil. Stream, Section No. 31. Fine soil for wheat. Village of <i>Koirbari</i> . A little cultivation and some open ground. Dense jungle.
		4 5 171	797'0	...	...	Village (deserted) of <i>Jondramura</i> . Good jungle all round.
		5 3 84	797'0	...	...	Village of <i>Manikgura</i> . A few huts in a small clearing in the jungle.
		7 7 184	837'0	...	...	Village of <i>Torbor</i> . Fields and gardens. Large tank. Rich dark soil.
		9 6 66	909'0	...	...	Stream 26'×6'. Sandy bed. Jungle with little cultivation. Soil hard and gravelly. Track cleared through the jungle. Stream 12'×3'; small stream 6'×3'; small stream 6'×3'.
278 2 205	...	12 2 42	949'0	92.	...	Stream, Section No. 32. Some sal here. Quartz. Light jungle with some patches of cultivation. Stream 6'×3'.
		1 1 7	929'0	...	...	Village of <i>Daldali</i> . Some cotton and a good deal of rice.
		4 0 183	929'0	...	...	Village of <i>Nuapara</i> . Large clearing. Hard soil. Wet and dry cultivation. Light jungle. Village of <i>Kandamuri</i> .
		5 2 97	969'0	...	...	Village of <i>Sambarsingi</i> . Track branches off to Tarnot.
		6 0 65	979'0	...	...	Village of <i>Kajurbara</i> . Undulating ground. Soil dark clay. Stream 10'×4'; stream 12'×5'.
		8 4 113	1,000'0	...	...	Village of <i>Sialjori</i> . Stream 8'×3'. Light jungle. Open country.
		9 6 65	1,027'0	...	...	Village of <i>Paraskol</i> . A tolerably large village. Jungle.
290 0 0	...	11 5 175	1,047'0	98.	...	High ground. Hard soil. Jungle. Trackless jungle. Hard soil. Stream 10'×5'. Jungle.
		1 4 139	1,047'0	...	...	Village of <i>Talbal</i> . Some garden cultivation. Wet and dry cultivation. Black soil north of village. Some open country. Stream 9'×3'. Village of <i>Kodumera</i> . Open country. Good camping ground. Stream 12'×5'.
		3 0 218	1,047'0	...	...	Village of <i>Daripali</i> . Open country. Some sal trees in jungle here. Soil brown sandy clay.
		5 2 78	967'0	...	...	Jungle. Fine level ground. Light jungle. Light soil.
		7 6 5	933'0	...	...	
		9 3 147	983'0	...	...	

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*Statement of particulars describing Mr. Nordmann's Route, &c.—contd.*

Distance from Vizagapatam	Distance between principal Stations.	Distance between Villages	Height above M. S. L.	Rise.	Fall.	REMARKS.	
						M. F. Y.	M. F. Y.
301 0 0	M. F. Y.	10 7 100	1,013·0	...	34	Village of <i>Birumal</i> . Fine open camping ground. Not good water. Stream 15' × 5'. Swampy soil. Jungle. Village of <i>Para</i> .	
		1 4 192	973·0	...	...	Village of <i>Gyran</i> . Large clearing. Light jungle. Dark clayey soil.	
		2 4 6	973·0	...	...	Village of <i>Sendebatta</i> . Rich soil. Undulating ground. Large clearing and jungle alternating.	
		3 4 0	...	...	...	Village of <i>Bavankela</i> . Stream 10' × 4'. Extensive rice-fields. Undulating ground Stream 29' × 5'.	
		5 6 0	903·0	...	...	Village of <i>Bisora</i> . Light jungle and scrub. Sāl trees. Light sandy soil. Dense jungle. Many sāl trees. Light jungle. Jungle.	
		8 1 39	873·0	...	...	Light soil. Slightly undulating ground.	
		9 0 210	840·0	...	...	Village of <i>Beltikri</i> . Open country around, about a mile in diameter.	
		11 0 23	840·0	...	...	Village of <i>Balasar</i> . Soil jungle. Quartz and kunkur.	
		12 3 133	918·0	...	95	Village of <i>Amundi</i> . Clearing in a sāl jungle. Soil stiff clay.	
		0 7 75	908·0	...	...	Stream, Section No. 33. Jungle.	
313 3 0	M. F. Y.	1 6 88	954·0	...	...	Village of <i>Parsoda</i> . Clearing in the jungle. Jungle. Stream 15' × 5'; stream 20' × 5'. Soil dark sandy clay.	
		4 2 212	884·0	...	...	Village of <i>Belenger</i> .	
		4 5 184	849·0	...	...	Stream, Section No. 34. Grass jungle. Hard soil and stony. Stream 6' × 3'. Black soil with cracks and holes. Stream 15' × 5'. Jungle.	
		...	909·0	...	...	Good tree jungle. Stream 15' × 5'. Soil stiff clay. Flat country.	
		6 7 17	899·0	...	19	Village of <i>Onki</i> . A few miserable huts. Jungle all around.	
		...	967·0	...	...	Village of <i>Jalbal</i> . Light jungle. Light clayey soil.	
		1 2 94	968·0	...	...	Village of <i>Salia</i> . Open country. Little jungle. Wet and dry cultivation. Some laterite.	
		2 1 108	947·0	...	...	Village of <i>Chanabeda</i> . Gardens and fields.	
		2 6 71	907	...	...	Stream, Section No. 34/a.	
		3 2 0	937	...	...	Do. do. No. 34/b.	
320 2 0	76 4 74	3 4 149	977	...	...	Village of <i>Amseri</i> . Wet and dry cultivation. Quartz reef running through small hill. Swampy ground	
		4 4 18	957·0	...	...	...	
		5 4 109	957·0	...	...	Village of <i>Kopathora</i> . Garden and field cultivation.	
		6 6 22	967·0	...	...	Village of <i>Mograpali</i> .	
		8 2 27	927·0	...	...	Jong stream, Section No. 34/c.	
		9 0 58	1,010·0	111 ft.	...	Village of <i>Nara</i> . Fine camping ground. Wet cultivation. Swamp. Stream 10' × 5'.	
		2 4 11	990·0	...	...	Village of <i>Ukra</i> . Wet cultivation. Light scrub jungle. Village of <i>Lami</i> .	
		4 1 153	970·0	...	...	Kandajori stream. Section No. 35. Gneiss with quartz veins.	
		4 5 155	980·0	...	...	And patches of feldspar. Village of <i>Kumakan</i> . Two large tanks. Wet cultivation. Stream 20' × 4'.	
		5 7 94	990·0	...	...	Village of <i>Kulia</i> . Much cultivation. Black soil. Jungle. Stream 6' × 3'.	
304 3 0	...	8 2 8	970·0	...	...	Village of <i>Puluari</i> in a small clearing.	
		8 7 133	1,033·0	...	...	Village of <i>Kopli</i> .	
		10 5 57	1,083·0	730	—	Village of <i>Bagbhra</i> . Wet cultivation. Jungle. Stream 12' × 4'. Irregular ground. Slightly hilly.	
		2 4 188	1,083·0	—	...	Jungle. Soil dark clay.	
		3 7 00	1,013·0	...	...	Site of the deserted village of <i>Pendri</i> . Dense jungle. Stream 25' × 5'. Sandy bed. Low banks. Undulating ground.	
		5 5 79	983·0	...	...	Village of <i>Patrapali</i> . Stream 10' × 4'. Garden cultivation. Stream 10' × 4'. Stream 8' × 4'.	

*Statement of particulars describing Mr. Nordmann's Route, &c.—contd.*

Distance from Vizagapatam-	Distance between principal Stations.	Distance between Villages.	Height above M.S.L.	Rise.	Fall.	REMARKS.	
						M. F. Y.	M. F. Y.
327 7 0 177	...	6 5 203	950' 0	...	...	Stream, Section No. 36. Jungle. Stream. Section No. 37.	
		7 5 125	1,002' 0	...	...	Fields and gardens near the village of <i>Kasi-bara</i> . Stream 8' × 3'. Stream, Section No. 38. Site of deserted village of <i>Aorai-babri</i> .	
		9 2 185	942' 0	...	...	Scrub jungle. Swamp. Village of <i>Kasi-bara</i> .	
		12 0 39	952' 0	...	...	Extensive garden and field cultivation.	
		12 6 204	1,022' 0	...	61	Village of <i>Telibanda</i> . Extensive wet cultivation.	
		1 1 33	982' 0	...	...	Jungle.	
		2 6 30	962' 0	...	...	Undulating ground.	
		3 7 70	942' 0	...	...	Village of <i>Manubamcha</i> . Extensive cultivation. Swamp. Stream 10' × 4'. No cultivation.	
		4 0 170	934' 0	...	...	Site of deserted village of <i>Pathripali</i> .	
		5 0 190	932' 0	...	...	Sikli stream 25' + 8'. Sandy bed. Good banks. Dry cultivation. Stream 6' × 3'.	
		6 3 38	902' 0	...	...	Village of <i>Arand</i> . Soil black and full of holes. Dry cultivation.	
		7 1 15	...	...	...	Village of <i>Umarda</i> .	
		7 6 120	932' 0	...	...	Stream 15' × 6'. Laterite rock for foundations. Soil light clay.	
		9 1 85	865' 0	...	...	Jungle. Stream 10' × 4'. Bed laterite and gravel. Jungle and swamp.	
339 6 0	...	10 3 182	895' 0	...	...	Village of <i>Puthripali</i> . Stream 10' × 5	
		11 6 124	915' 0	...	107'	Wet and dry cultivation. Stream 12' + 4'.	
		1 3 67	875' 0	...	...	Village of <i>Patiajer</i> . Good camping ground.	
		3 5 48	855' 0	...	...	Village of <i>Mahasamund</i> .	
		5 7 184	810' 0	...	...	Village of <i>Karora</i> . Extensive cultivation, chiefly wet. No jungle. Good topes and trees. Tanks.	
		6 4 201	...	...	...	Village of <i>Belsora</i> . Wet cultivation. Flat country.	
		7 6 4	933' 0	...	...	Village of <i>Gorary</i> . Mahanadi river.	
350 0 0	...	10 2 100	942' 0	27'	...	Village of <i>Paragaon</i> . Soil clay. Stream 20' × 6'. High banks. Stony bed. Limestone.	
		2 6 76	963' 0	...	...	Town of <i>Arang</i> . Village of <i>Bihihar</i>	
		5 2 27	923' 0	...	...	Open flat country, well cultivated. Black soil.	
		7 2 92	923' 0	...	...	Village of <i>Rasni</i> . Tanks. Tope, sugar-cane and rice-fields. Ground slightly undulating. Soil laterite. All cultivation.	
		10 2 21	949' 0	...	...	<i>Kulham</i> stream, Section No. 40. Red soil. Wheat cultivation. All land under cultivation.	
363 4 0	...	13 4 10	969' 7	27' 7	...	Village of <i>Naogaon</i> . Extensive cultivation. Good camping ground. Light clay soil. Wells.	
		2 1 50	929' 0	...	...	Village of <i>Hasaud</i> . All ground under cultivation, wet and dry.	
		3 5 185	900' 0	...	...	Village of <i>Sirikheri</i> .	
		5 0 97	942' 0	...	...	Village of <i>Jora</i> . All land under cultivation. Chiefly wet. Black soil.	
		6 6 130	992' 0	...	...	Village of <i>Labhandih</i> . Stream, Section No. 41. Black soil. Stream 15' × 6'.	
371 5 211	76 7 193	8 1 80	962' 0	...	7' 7	Black soil. Wheat and linseed.	
						Village of <i>Kurwatoli</i> . Tank. Tope of mhowa trees.	
						Town of <i>Raipur</i> .	

## XXV.

*Statement of particulars describing Mr. Nordmann's Route from Raipur (via Rajim, Naogarh, and Narangpur) to Kuraputty.*

Distance from Raipur.	Distance between principal Stations.	Distance between Villages.	Height above M. S. L.	Rise.	Fall.	Remarks.	
						M. F. Y.	M. F. Y.
			963·0	...	...	Camp at Raipur, near the Deputy Commissioner's Office. Town of Raipur. Outside the Cantonment.	
		1 4 3	963·0	...	...	Irrigation channel. Limestone rock on surface. Good road.	
		3 0 146	911·0	...	...	Village of Lalgaon; tank; soil laterite.	
		5 0 187	911·0	...	...	Village of Deopur.	
		6 4 135	941·0	...	...	Village of Dumurtulæ; soil laterite; covered with brown clay; wet and dry cultivation; some waste land; dark clayey soil, full of cracks and fissures.	
		8 2 4	941·0	...	...	Village of Mana; tank, topes, garden, and well; ironstone, gravel, and red sandstone.	
		10 0 75	971·0	...	...	Nembhora talas; tank. Village half a mile distant. Ironstone, gravel, and red sandstone near village of Uparwara; tank, topes, garden, and well; fields of rice and wheat.	
		11 6 178	931·0	...	...	Taivar stream 20' x 7'. Bed clay and gravel; banks well defined; laterite soil.	
		13 5 17	951·0	...	...	Ghatoria stream 15' x 6'. Bed laterite gravel; perpendicular banks.	
	14 2 137	14 2 137	1001·0	38·	...	Khandwa village; topes, gardens, and tank; soil laterite.	
						Chittar stream 10' x 5'. Muddy bed; high banks; black soil.	
		1 1 130	989·0	...	...	All cultivation; very little waste land; black soil; rice and wheat fields. Kolhan stream 20' x 10'; banks well defined; bed sand and gravel. Village of Thaoud to the right.	
		2 4 160	977·0	...	...	Cross road going north and south. Red soil and laterite. Rice fields.	
		3 4 95	989·0	...	...	Village of Sunderkhera, with topes and tanks; extensive wet and dry fields; soil chocolate colored with small stones and gravel; sandy stone.	
		5 3 154	971·	...	...	Village of Parsada; a large village stream, section No. 1; soil black; topes; much linseed cultivation.	
		7 1 38	952·0	...	...	Village of Ghonth. Stream 15' x 10'. Steep banks; bed soft; soil black.	
		8 5 180	946·0	...	...	Village of Paragaon, large village; groves of mango and tamarind trees; laterite rock.	
		10 1 175	955·0	...	...		
		10 6 35	914·0	...	...	Mahānadi River, Section No. 2.	
	25 5 0	11 2 118	914·0	...	...	Village or Rajim. Mango topes; waste land; black soil; open country; topes and fields. Wheat, linseed, Bengal gram. Rice fields; tank.	
		11 2 118	917·0	...	84	Village of Chobebhandha; garden cultivation; wells; much wet cultivation; some waste land.	
		2 2 111	938·0	...	...	Village of Sindhori.	
		4 2 117	928·0	...	...	Village of Baronda; light soil; gardens wet and dry fields; sugarcane, castor oil; red gravelly soil; stream, section No. 3 black soil. Village of Chichudh.	
		6 2 12	978·0	...	...	Village of Kuraskera; tope and large gardens; light soil.	
		8 0 0	901·0	...	...	Village of Tara; gardens, topes, and small tanks; light soil; mango tope; plantation of young mango trees.	
	35 7 21	10 1 206	931·0	14	...	Village of Kopra; tank, topes, and gardens; black soil; dry crops; castor-oil trees and linseed; some waste land. Stream 10' x 5'; high banks; soft bed.	
		1 3 85	899·0	...	...	.....	

*Statement of particulars describing Mr. Nordmann's Route, &c.,—contd.*

Distance from Raipur.	Distance between principal Stations.	Distance between Villages.	Height above M. S. L.	Rise.	Fall.	REMARKS.
M. F. Y.	M. F. Y.	M. F. Y.	Feet.	Feet.	Feet.	
		2 4 25	899'0	...	...	Village of Surkunda, gardens and wells sugarcane, plantains, castor-oil, chillies, brinjals; tank; black soil; jungle. Village of Panduka; Police Station; tank.
		4 1 73	915'0	...	...	Village of Kutna; light jungle; sandstone rock cropping out. Jungle stream 9' x 4'; good banks; hard bed; much sandstone rock about.
		5 3 62	899'0	...	...	Light soil; sugarcane plantation. Stream 25' x 8'; good banks; hard bed; jungle, with some cultivation. Rice fields.
		6 4 70	923'0	...	...	Village of Kukda. Jungle all around; sandstone and gneiss and some laterite. Rice fields in jungle. Light clayey soil; scrub jungle.
		7 7 130	915'0	...	...	Gneiss rock; dense jungle; swampy soil; rudely cultivated soil alternately stony and swampy; stream 12' x 5'; steep banks; soil bed; stream 7' x 4'.
		9 0 0	...	...	...	.....
		9 1 160	...	...	...	Stream 9' x 4'.
		9 2 0	...	...	...	Stream 12' x 5'.
		9 3 25	...	...	...	Deserted village of Pahpur.
		9 4 0	939'0	...	...	Stream 9' x 4'. Stream 9' x 4'; broken ground; dense jungle and high grass; hill side cutting required; all rocky hill side; cutting required.
		10 6 145	992'0	...	...	Stream 25' x 6': sandy bed.
47 7 21	12 0 0	12 0 0	992'0	61'	...	Village of Bourka, a small village in a jungle clearing. Hilly jungle. Rice cultivation in a swamp. Low hill ridges on both sides; soil hard and gravelly; kunkur limestone, gneiss, and conglomerate rock.
		1 5 98	978'0	...	...	Jungle; light soil; some rock.
		2 1 6	...	...	...	Stream 10' x 4'. Low banks; sandy bed.
		2 4 0	...	...	...	Stream 10' x 4'.
		3 5 37	964'0	...	...	Do. 10' x 4'.
		4 4 190	...	...	...	A large clearing in the jungle. Village of Karti on opposite side of river. Village of Kurubata; tank; extensive rice fields.
		5 0 144	...	...	...	Village of Malga on the hill side.
		5 2 214	1,006'0	...	...	Pari River. Section No. 4. Country largely cleared. Rice, Bengal grain, sugarcane, linseed, castor-oil trees, tobacco, and wheat.
		6 1 0	978'0	...	...	Small tank, black soil. Village of Manjarkata; ground recently cleared and cultivated; sheet rock, gneiss.
		7 1 107	1,006'0	...	...	Village of Amdi; some cultivation; thin jungle. Flat country.
		7 6 142	...	...	...	Stream 12' x 5'. Stream, section No. 5. Village of Paraga; good gardens; and avenue of young mango trees.
		8 5 0	...	...	...	Sheet rock; gneiss; stream 20' x 4'.
57 2 126	9 3 105	9 3 105	1,130'0	138'	...	Deserted village of Dongriga. Stream, section No. 6. Soil alternately swampy and stony; ground level with slight undulations. Dense small jungle; stream 12' x 3'.
		1 3 146	1,119'0	...	...	Tirnai stream, section No. 7; gneiss and quartz rock.
		1 7 0	...	...	...	Soil alternately hard and gravelly; stream 9' x 3'; sandy loam; tall young timber; undulating ground.
		2 6 54	1,163'0	...	...	Bugai stream, section No. 8. Rising ground; stony soil; drainage channel 6' x 4'; all jungle; hard soil; tall grass; several small drainage channels.
		4 1 40	1,207'0	...	...	Korihardi stream, 25' x 3'. Sandy bed; hard soil; tall jungle with undergrowth high grass; hard gravelly soil; undulating ground; hill side cutting required; good matti timber abundant. Mogai stream 16' x 4'.

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*Statement of particulars describing Mr. Nordmann's Route, &c.,—contd.*

Distance from Raipur.	Distance between principal Stations.	Distance between Villages.	Height above M. S. L.	Rise.	Fall.	REMARKS.
M. F. Y.	M. F. Y.	M. F. Y.	Feet.	Feet.	Feet.	
		5 5 187	1,330' 0	...	...	Head of Urtuli Ghāt; hilly jungle and stony, irregular ground; ground flat again, only gently undulating; some grassy plots in jungle (the road need not come so high up; this summit can be circumvented).
		7 4 92	1,303' 0	...	...	Patches of grass and swamps; deserted village of Joba; stream 5' × 3'; black soil; stream 6' × 4'; stony soil.
		9 1 172	1,324' 0	...	...	All jungle; some broken and irregular ground and stony; much young sāl wood. Teregi stream, 15' × 9'; all sāl jungle; some matti trees.
		10 1 152	1,240' 0	...	...	Kosani stream, 20' × 4'; rock for foundations; undulating ground; good hard soil.
		11 2 170	1,264' 0	...	...	Harpali stream, 25' × 7'; sandy bed; steep banks.
		12 5 110	...	...	...	Village of Noagarh. Jungle, irregular ground; light sandy soil, occasionally rocky.
70 3 154	13 1 28	13 1 28	1,314' 0	184'	...	Summit level of rise.
		1 2 165	1,324' 0	...	...	Some hill side cutting required. Murgi stream, 15' × 4'; high grass; much young sāl.
		1 4 0	...	...	...	Terigi stream, 15' × 7'. Abundance of quartz, pink and red.
		2 1 168	1,294' 0	...	...	Bardul, a clear spot in the jungle. Ground flat and somewhat swampy.
		2 6 8	1,294' 0	...	...	Satigat stream, section No. 9. Soil light sandy loam; ground nearly flat; slight undulations.
		3 5 12	1,274' 0	...	...	Area of deserted fields.
		4 2 190	...	...	...	Kusmi stream, section No. 10. A temple, but surrounded with palisades.
		4 4 0	...	...	...	Village of Kusmi, a large clearing with extensive rice fields. Rich soil.
		5 0 70	...	...	...	Jungle. Young sāl; gneiss rock.
		5 4 0	...	...	...	Stream 8' × 4'.
		6 4 0	...	...	...	Do. 8' × 2'.
		6 6 0	...	...	...	Village of Boirga, small village fenced in, soil good; swamp; black soil. Jungle; sāl forest 10 to 15 years old. Tall grass.
		7 5 3	1,294' 0	...	...	Kolbora stream, 15' × 4'. Gneiss rock for foundation. Jungle.
		9 2 0	1,234' 0	...	...	Budra stream, section No. 11. Grass 7' to 10' high.
		9 5 20	...	...	...	Amajori stream, 25' × 5'. Sandy bed; no rock.
81 2 65	10 6 131	10 6 131	1,295' 0	...	19	Village of Baltema; 8 huts in a wilderness. Low scrub jungle with young sāl and tall grass.
		...	...	...	...	Rich dark soil.
		0 4 0	...	...	...	Village of Pendra, partly deserted. Soil reddish sandy loam.
		1 2 20	1,295' 0	...	...	Uneven ground. Stream 10' × 4'.
		1 6 0	...	...	...	Village of Pendra, in a new clearing.
		2 2 12	1,335' 0	...	...	Maria stream, 10' × 3'. Uneven and broken ground; much quartz about.
		2 4 0	...	...	...	Parsapani stream, 15' × 4'.
		2 6 0	...	...	...	Jamun stream, 9' × 3'.
		3 0 70	...	...	...	Pulbhari stream, 25' × 4'. Some rock for foundations; sandy bed; good banks.
		3 5 42	1,275' 0	...	...	Sarai stream, 12' × 4'. Sāl jungle; tall grass.
		3 7 0	...	...	...	Tari stream, 20' × 5'. Rocky bed; steep banks.
		4 2 50	...	...	...	Ground uneven, hard and stony.
		4 3 0	...	...	...	A hill of quartz.
		4 5 18	...	...	...	Chicklahi stream, 15' × 3'. Rocky bed; pink quartz; gneiss and conglomerate.
		4 7 0	...	...	...	Deserted village of Gobra.
		5 2 40	1,285' 0	...	...	Quartzose gneiss and conglomerate.
		5 3 0	...	...	...	Gogor stream, section No. 12. Good bridge; site solid rock on both sides. Wild jungle and tall coarse grass.
		5 7 205	1,265' 0	...	...	

*Statement of particulars describing Mr. Nordmann's Route, &c.—contd.*

Distance from Raipur.	Distance between principal Stations.	Distance between Villages.	Height above M.S.L.	Rise.		REMARKS.
				M. F. Y.	M. F. Y.	
				Feet.	Feet.	
		6 5 50	...	...	...	Deserted village of Katipara. Flat country marshy glade jungle.
		7 4 0	...	...	...	Sheet rock; gneiss. Fine young forest, chiefly sâl.
		8 3 110	1,335'	...	...	Burpani stream, 10' × 4'. Stream 7' × 3'. Wild jungle and tall grass.
		9 0 0	...	...	...	Stream 5' × 3'. Flat ground; some swampy. Mura Cora stream, 10' × 4'. Fine young sâl forest; stately forest; sâl and matti.
		10 3 170	1,390'	...	...	Junction of Dhour and Sondor Rivers. Dhour River, section No. 13.
		10 6 0	...	...	...	Village of Temai; 3 or 4 huts in a jungle clearing; abandoned rice fields; black soil; swampy.
63 2 135	12 0 70	12 0 70	1,441' 0	146	...	Village of Tumaribahal; all jungle.
		0 5 92	1,441' 0	...	...	Deserted village of Mudibahal; some ploughed fields.
		1 0 0	...	...	...	Ground flat; soil light and soft sandy clay; clearings and grass plots in the jungle; jungle light; drainage channel, 5' × 3', small swamp.
		...	...	...	...	Village of Kasror; 4 huts; 20 people; hills to the left; one point marked 2,445' on map.
		2 4 152	1,441' 0	...	...	Kamunkor stream, 15' × 4'. Soft bed, steep banks.
		3 0 100	...	...	...	Tall rank grass; forest of sâl; ground slightly undulating. Kauribaha stream, 15' × 5'. Soil light sandy clay.
		3 2 70	...	...	...	Tel Dhorigi stream, 20' × 5'. Steep banks; gravelly bed.
		4 0 194	1,431' 0	...	...	Village of Borpodor; 15 huts, 60 people rice fields; gardens. Katasaru stream, 25' × 5', converted into rice-fields.
		4 4 160	...	...	...	Kunnar stream, 20' × 5'. Rocky bed; some undulating ground.
		5 2 62	1,441' 0	...	...	Jhurra stream, 15' × 5'. Young sâl jungle; undulating ground.
		5 7 0	...	...	...	Kaser stream, 12' × 5'. Stream 8' × 3'.
		6 5 210	1,471' 0	...	...	Urai stream, 8' × 3'. Stony undulating ground.
		7 0 0	...	...	...	Lafni stream, 18' × 5'. Rocky bed; much quartz in small fragments on the surface.
		7 3 146	1,482' 0	...	...	Kissi stream, 15' × 4'.
		7 7 0	...	...	...	Village of Karki; 5 huts with 25 people.
		8 3 100	1,514' 0	...	...	Bag stream, section No. 14.
		8 6 48	...	...	...	Village of Risgaon; 15 huts, 60 people; tamarind tree for camping; fields and gardens. Stream 20' × 5' in swamp; light jungle; some swampy ground.
104 0 85	10 5 170	10 5 170	1,569' 0	128	...	Deserted village of Kursudi. Sâl jungle with grassy glades.
		0 6 180	1,585' 0	...	...	Jungle; slightly undulating ground; fine tall jungle and forest trees.
		2 3 205	1,647' 0	...	...	Pandripani stream, 10' × 4'.
		3 5 117	1,634' 0	...	...	Soroa River, section No. 15.
		3 6 150	...	...	...	Deserted village of Gourgaon. Soil rich clay.
		4 0 170	1,647' 0	...	...	Country flat; hills in front and to right. Stream 15' × 5'; clayey soil; low scrub jungle and coarse grass.
		4 4 145	...	...	...	...
		5 1 20	1,647' 0	...	...	Forest; some large teak; irregular ground, undulating; sâl jungle; ground flat; good soil; jungle.
		...	...	...	...	Enter Jeypur territory. Ground flat; forest of sâl and ippa.
		7 0 0	1,777' 0	...	...	Small drainage to the left, 8' × 3'; swamp with black soil.
112 7 165	8 7 80	8 7 80	1,870' 0	301	...	Village of Hathgaon. Swamp and rice fields; tall grass and jungle.
		0 7 86	1,910' 0	...	...	Sâl jungle.

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*Statement of particulars describing Mr. Nordmann's Route, &c.—contd.*

Distance from Raipur.	Distance between principal Stations.	Distance between Villages.	Height above M.S.L.	Rise.		Fall.	REMARKS.
				M. F. Y.	M. F. Y.		
				...	...	...	
124 0 45	11 0 100	1 4 109	2,010' 0	...	...	...	(This rise can be circumvented by tracing along the banks of the Galaria stream, about a mile to the east.)
		2 0 57	2,020' 0	...	...	...	Kurudadodi stream, 10' × 3'. Road branches off to Kosimpur; rock about.
		3 2 28	1,970' 0	...	...	...	Jungle of tall mati and sā.
		3 6 40	1,964' 0	...	...	...	Galaria stream, 25' × 5'. Swampy glade: swampy glade; dense young sā jungle.
		5 4 6	2,094' 0	...	...	...	Here begins the Jeypur plateau.
		6 0 100	2,090' 0	...	...	...	Large clearing near Kuruberā; swamp and rice fields. The champaign country of Jeypur.
		7 3 6	1,990' 0	...	...	...	Village of Kolapodur; low scrub jungle; soil dark clay.
		8 6 80	2,070' 0	...	...	...	...
		...	...	...	...	...	Jungle; young sā; flat country; swamp and jungle; soil less dark and heavy.
		10 5 63	2,080' 0	...	...	...	...
124 0 45	11 0 100	11 0 100	2,104' 0	231	...	...	Village of Raigarh; 40 houses, 150 people; swamp jungle; soil hard brown loam; laterite and gneiss.
		1 7 125	2,055' 0	...	...	...	Cultivated land; swamp; jungle swamp partly cultivated.
		3 2 22	2,065' 0	...	...	...	Besotted village of Kunli. Large cultivated swamp; jungle sā and scrub; fine forest mati, sā, blackwood.
		5 2 165	2,055' 0	...	...	...	Small glade; fine forest; soil rich clay.
		6 0 0	...	...	...	...	Ground gently undulating; primeval forest.
		7 5 35	1,934' 0	...	...	...	Soil light brown sandy clay.
		9 4 84	1,942' 0	...	...	...	Sā jungle; soil sandy loam.
		10 4 4	...	...	...	...	...
		10 5 0	1,977' 0	...	...	...	...
136 4 88	11 4 43	11 4 43	1,967' 0	...	134	...	A ledge of gneiss rock cropping out.
		...	...	...	...	...	Village of Beā; 15 huts, 40 people.
		0 5 0	1,977' 0	...	...	...	Ti Nadi, section No. 16. Jungle and high grass.
		0 6 0	...	...	...	...	...
		...	...	...	...	...	Primeval forest; ground slightly undulating.
		2 2 140	1,997' 0	...	...	...	...
		3 1 40	2,017' 0	...	...	...	Village of Burja; 50 houses, 150 people.
		3 5 0	...	...	...	...	Poragada hills to the south; swamp.
		4 0 0	...	...	...	...	...
		...	...	...	...	...	Scrub jungle; good soil; fields and light jungle.
		5 3 0	2,010' 0	...	...	...	Clearing and swamp; light jungle; swamp cultivated.
		7 3 0	2,000' 0	...	...	...	Bhā-kel Nullah, section No. 17.
143 0 186	7 4 98	7 4 98	2,021' 0	54	...	...	Village of Mākot. Jungle; sā.
		1 3 178	2,011' 0	...	...	...	Jungle; some rock; light sandy loam.
		2 0 0	...	...	...	...	Village of Dongrigura.
		3 3 190	1,971' 0	...	...	...	Swamp with some cultivation; rich dark soil.
		4 0 175	1,971' 0	...	...	...	Village of Soma Borondi. Large gardens; swamp; young mango trees.
		5 1 64	1,971' 0	...	...	...	Village of Bāo Borondi.
		6 3 124	1,911' 0	...	...	...	Large gardens
		7 0 169	1,961' 0	...	...	...	Nagi River, section No. 18 (reading taken in bed of stream); laterite cropping out.
		9 4 71	1,911' 0	...	...	...	Village of Dodra. Extensive rice fields; light jungle; a tank with some rice fields; light jungle and clearings alternately.
		11 6 0	1,931' 0	...	...	...	Village of Tetargāon. Swamp; gently undulating ground; scrub jungles; swamp; small sā jungle.
		11 7 200	...	...	...	...	Village of Chatāgura.
155 5 2	12 4 36	12 4 36	1,955' 0	...	66	...	Chatāgī River, section No. 19.
		1 4 15	1,935' 0	...	...	...	Village of Bījepur. Sā jungle; soil stiff clay; sā jungle.
		3 2 2	1,925' 0	...	...	...	Soil sandy.
							Large swamp, partly bounded up; village of Nakjor.

## Statement of particulars describing Mr. Nordmann's Route, &amp;c.—contd.

Distance from Raipur.	Distance between principal Stations.	Distance between Villages.	Height above M.S.L.			REMARKS.
				M. F. Y.	M. F. Y.	
			Feet.	Feet.	Feet.	
		4 2 20	1,895'0	...	...	Swamp; stream 9'×4'.
		5 2 175	1,875'0	...	...	Small sâl jungle.
		6 2 206	1,845'0	...	...	Bâri stream, section No. 20. (Reading taken in the bed of the stream.)
		7 4 65	1,923'0	...	...	Jungle cleared 20 feet wide for the road; fine sâl forest; undulating ground. Stream 9'×3'; swamp.
		8 7 176	1,963'0	...	...	Black soil; jungle; soil sandy loam; swamp.
		...	...	...	...	Village of Dabgaon. Fine camping grounds.
166 3 71	10 6 69	10 6 69	1,983'0	28	...	Ongi stream, section No. 21; jungle.
		0 3 106	...	...	...	Village of Moideri. Undulating ground; swamp; fine sâl forest.
		2 0 94	1,983'0	...	...	Drain 5'×3'.
		3 0 0	1,973'0	...	...	Jungle; swamp.
		4 1 117	1,973'0	...	...	Undulating ground; jungle; sandy soil.
		5 2 23	1,953'0	...	...	Village of Barigura.
		6 6 130	1,913'0	...	...	Village of Jerabahal. Swamp.
		7 1 43	1,893'0	...	...	Basni stream, section No. 22. Swamp; small sâl jungle; sandy soil.
		9 4 155	1,953	...	...	Summit of rising ground; small sâl jungle; swamp.
		10 6 0	1,902'0	...	...	Turi stream, section No. 23.
177 3 137	11 0 66	11 0 66	1,922'0	...	61	Village of Paparhandi; 100 houses, 400 people; old mud fort and stone temple; good camping ground.
		1 1 59	1,972'0	...	...	Fine tree jungle and swamp; rising ground. Red soil; swamp; stream 10'×5'; scrub jungle.
		2 6 4	1,892'0	...	...	Swamp cultivated.
		3 0 32	1,870'0	...	...	Gantat River, section No. 24.
		4 1 19	1,944'0	...	...	Top of rise; scrub jungle; swamp; swamp.
		6 0 18	1,912'0	...	...	Fine mango tope; avenue for two miles, laterite rock; mango tope; avenue.
185 4 110	8 0 193	8 0 193	1,918'0	...	4	Village of Narangpur; 650 houses, 4,000 people; camp at Narangpur; town of Narangpur; extensive rice fields; mango topes. Village of Barabukli; stream 25'×8'; muddy banks and bed.
		1 3 202	...	...	...	Soil red; some laterite.
		1 5 63	1,864'0	...	...	Indrabati River, section No. 25. Some light jungle; dry erops, Bengal gram, dâl, and tobacco; rice fields.
		3 0 81	1,864'0	...	...	Enter jungle; rising ground; some laterite gravel.
		...	...	...	...	Summit of rise.
		3 5 81	1,918'0	...	...	Foot of slope.
		4 0 94	1,882'0	...	...	...
		4 6 84	1,882'0	...	...	Jungle.
		5 3 146	1,936'0	...	...	Summit of ascent, soil red, gravel.
		...	...	...	...	Small jungle.
		6 0 0	...	...	...	Stream 7'×3'; swamp; jungle.
		7 6 137	1,927'0	...	...	On shoulder of big hill; soil brown clay; light jungle.
		7 7 95	1,882'0	...	...	Paddy flat; village of Porli; 30 houses, 120 people.
194 1 210	8 5 100	8 5 100	1,873'0	...	45	Camp at Porli; cultivated swamp; stream 30'×10'; steep soft banks; soil sandy loam.
		1 2 172	1,913'0	...	...	Undulating ground; long glade to the left; fine mango tope; topes, fields, and swamps.
		2 2 138	1,913'0	...	...	Soil clay; rice-fields.
		3 1 70	1,903'0	...	...	Swamp cultivated.
		4 0 73	1,953'0	...	...	Village of Boriguma; 100 houses; bungalow of mud and thatch.
		4 6 136	1,953'0	...	...	Near the village of Dullaguda; swamp and jungle; heavy clayey soil.
		5 6 147	1,983'0	...	...	Undulating country; mango topes; rice fields; swamp.
		7 1 100	1,982'0	...	...	Hilly country with swamp; rice fields.

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*Statement of particulars describing Mr. Nordmann's Route, &c.—cont'd.*

Distance from Raipur.	Distance between principal Stations.	Distance between Villages.	Height above M.S.L.	Rise.	Fall.	REMARKS.
M. F. Y. 202 7 208	M. F. Y. 8 5 218	M. F. Y. 8 5 218	Feet. 1,981' 0	Feet. 108	Feet. ...	Camp near the village of Pupagón; light jungle; soil stiff brown clay.
		1 0 80	2,041' 0	...	...	Summit of ascent; light jungle with patches of cultivation; soil stiff clay. Village of Kumerput, swamp made into fields. Village of Kebuddy.
		2 6 20	1,971' 0	...	...	Telingiri river; Section No. 26; near Cheptaamb, site of former village. Stream, rice fields on sloping ground; rain fed; many mhowa trees. Village of Beriput; dry cultivation.
		4 3 30	2,017' 0	...	...	Soil dark brown clay; hills on both sides; irregular ground; rocky; road is on hill side; cutting alongside Telingiri river.
		6 1 200	2,037' 0	...	...	Stream 15' x 6'; hilly jungle on the bank of the Telingiri river.
210 0 72	7 0 84	7 0 84	2,017' 0	36	...	Village of Ránigar, five huts. Telingiri river; hill stream 10' x 4'; hill side road; jungle; some clearing; hard rocky soil.
		1 0 200	2,094' 0	...	...	Bifurcation of roads to Mädéoputi and Kuraputi; uneven ground; some cutting and embanking required; stream 12' x 4'; soil soft clay; some rock.
		1 7 125	2,061' 0	...	...	All hill side cutting; stony hill side; hard soil; good jungle; fine sál and matti trees.
		2 4 0	...	...	...	Stream 12' x 4'. Stony bed and banks.
		2 4 207	2,105' 0	...	...	On river bank, Section No. 27.
		2 6 173	2,105' 0	...	...	Young mango top; fields; village of Musaput; stony stream 12' x 4'. The hill side partly cultivated, chiefly with castor-oil trees. Stream 12' x 4'.
		4 2 150	2,160' 0	...	...	Village of Bandakatra; ten houses with gardens; stream 15' x 4'; stony soil; stony and swampy stream.
		5 4 40	2,314' 0	...	...	Mango top; broad flat saddle.
		5 7 100	2,380' 0	...	...	Village of Panasput. Tank for drinking water; soil red gravel; stony stream; fine mango trees.
		6 6 25	2,457' 0	...	...	Soil red sandy loam; small mango grove. Plateau.
		7 4 180	2,457' 0	...	...	Village of Mädéoputi; 30 houses; tamarind and mango topes; no jungle; much dry cultivation.
		8 6 108	2,479' 0	...	...	Village of Muchra. Stream 20' x 5'; soil yellow clay with sand; stream 12' x 4'.
220 0 27	9 7 175	9 7 175	2,520' 0	503	...	Village of Mastiput.
223 4 27	3 4 0	3 4 0	2,900' 0	380	...	Village of Kuraputi.

XXVI.

*Statement of particulars describing Mr. Nordmann's Route from Mastiput across the Jeypur Plateau and down the Eastern Ghâls to Sá'ur.*

Distance from Vizagapatam.	Distance between principal Stations.	Distance between Villages.	Height above M.S.L.	Rise.	Fall.	REMARKS.
M. F. Y.	M. F. Y.	M. F. Y.	Feet.	Feet.	Feet.	
		...	2,520' 0	...	...	Near the village of Mastiput.
		...	2,560' 0	...	...	Along the banks of the Kuradi.
		1 1 92	2,560' 0	...	...	Low hills on the left.
		1 2 0	...	...	...	Low scrub jungle, hard light soil.
		2 5 0	...	...	...	Stream 25' x 8'. Ground somewhat irregular.
		2 6 47	2,670' 0	150	...	Hilly and irregular ground, stony. Stream 8' x 5'.

## Statement of particulars describing Mr. Nordmann's route, &amp;c.—contd.

Distance from Vizagapatam.	Distance between principal Stations.	Distance between Villages.	Height above M.S.L.	Rise.	Fall.	REMARKS.
M. F. Y.	M. F. Y.	M. F. Y.	Feet.	Feet.	Feet.	
		...	...	...	...	Stony hill side.
		...	...	...	...	Sandy brown clay.
		...	...	...	...	No cultivation since; Mastiput.
		3 6 52	2,880 0	210	...	Rock
						Linka saddle.
						(NOTE.—By keeping along the hill-side above the village of Mastiput the gradient to the saddle can be considerably eased.)
		4 0 0	...	...	...	treach 25' × 5'.
						Soil clay, rather stony.
						Stream 8' × 7'.
						Dry cultivation.
		5 0 76	2,830 0	...	...	Village of Nigamangura.
						Rice fields.
						Stream 25' × 7'.
						Join the high road from Kuraputi to Potinghi.
		5 6 92	2,799 0	...	...	.....
		6 6 195	2,759 0	...	...	Village of Dunniput.
						Karandi stream 30' × 9'. Soft clay banks.
						muddy bed.
	7 7 143	7 7 143	2,779 0	...	101	On the high road near Chikapar bridge.
						Karandi stream, Section No. 1.
						Dry crops.
						No jungle.
						Soil stiff clay.
		1 4 165	2,869 0	...	...	.....
						Scrub jungle.
		2 6 193	2,949 0	...	...	Saddle.
						Stream 12' × 4'.
						Dry cultivation.
						No jungle.
		4 5 76	2,869 0	...	...	Near the old Semligurah Police Station.
						(Present from the saddle can be made at an easier gradient than that of the present road.)
		5 7 11	2,839 0	...	...	Stream 30' × 8'. Steep soft banks, sandy bed, no rock.
						Wet and dry cultivation.
						No jungle.
		7 0 70	2,840 0	...	...	Soil brown clay, latite rock below surface.
						Stream 24' × 8'. Steep clayey banks, some jungle.
		8 5 99	2,897 0	...	...	Light scrub jungle.
		9 0 143	...	...	...	Stream 45' × 7'. Section No. 2.
	9 3 103	9 3 103	2,870 0	91	...	Camp Doliamb.
						Stream 25' × 10'. Steep clay banks, bed sand with shingle.
						Some dry cultivation.
		1 4 197	2,780 0	...	...	Leave the road.
		3 0 145	2,840 0	...	...	Village of Kundili.
						Ampie wet cultivation.
		3 4 206	2,745 0	...	...	Stream 35' × 9'. Section No. 3.
						Village of Temba.
		4 5 22	2,780 0	...	...	Village of Dusra on the right.
						In a narrow valley.
		5 5 60	2,745 0	...	...	Cross track from Potinghi to Nandapur.
		5 7 173	2,780 0	...	...	Stream 25' × 8'.
						Near the village of Kir jola Dusra, dry cultivation, ragi, plantain and castor-oil trees.
						Hills and jungle all round.
						Some hill-side cutting required.
		7 3 209	2,840 0	...	...	Passing between { Deo Potinghi.
						Sargigura
						Dry cultivation.
		9 0 35	2,795 0	...	...	Village of Deo Potinghi, thin scrub jungle and stunted dates.
		9 6 35	2,975 0	...	...	Pass through a gorge.
						Hill-side cutting required.
	11 4 90	11 4 90	3,190 0	320	...	Flat ground, broken here and there.
						Dokrigat saddle.
						(NOTE.—The section shows chiefly the present track; an easier line for road can of course be traced along the hill-side.)

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*Statement of Particulars describing Mr. Nordmann's Route, &c. —contd.*

Distance from Vizagapatam.	Distance between Principal Stations.	Distance between Villages.	Height above M. S. L.	Rise.	Fall.	REMARKS.
M. F. Y.	M. F. Y.	M. F. Y.	Feet.	Feet.	Feet.	
		2 0 42	3,017'0	...	...	Stream.
		...	...	...	...	Village of Pukeli to the right.
		3 7 12	3,185'0	...	5	Village of Pukeliguda.
		4 1 148	3,150'0	...	...	Some dry cultivation.
		...	...	...	...	Pukeli saddle.
		5 1 92	...	...	...	Stream 12' x 4'.
		5 6 152	3,190'0	...	...	Hilly jungle.
		6 5 52	3,210'0	...	...	Soil brown clay.
		...	...	...	...	
	7 6 92	7 6 92	3,250'0	65	...	Jungle and dry cultivation.
		2,870'0	...	...	...	Stream 15' x 4'.
		3 0 145	2,840'0	...	...	Dry cultivation and jungle.
		...	...	...	...	Opposite village of Chandka.
		7 6 92	3,250'0	65	...	Light soil.
		2,870'0	...	...	...	Dry cultivation.
		3 0 145	2,840'0	...	...	Merialpád saddle.
		...	...	...	...	Camp at Doliamb.
		12 0 0	12 0 0	3,017'0	...	Village of Kundili.
		...	3,250'0	380	...	(This line represents the fall of the Kolab river between Pukeli and Kundili.)
		15 0 0	15 0 0	2,213'0	...	Village of Pukeli.
		2,250'0	1,037	...	...	Merialpád saddle.
		2 4 0	3,107'0	...	...	(This line represents a trace that can be made along the hill-side at a gradient of 1 in 76 between the termini—distance 15 miles.)
		9 6 0	9 6 0	2,600'0	650	Páchipenta saddle.
		...	...	...	...	Merialpád saddle.
		5 4 0	5 4 0	2,213'0	387	Merialpád cutting.
		...	2,600'0	...	...	Lávidy saddle.
		2 4 0	2,494'0	...	...	(Gradient 1 in 125.)
		8 0 0	8 0 0	2,213'0	...	High Sánkipenta.
		...	...	...	...	(Gradient 1 in 100.)
		14 0 0	14 0 0	770'0	1,443	Páchipenta saddle.
		...	3,250'0	...	...	(Fall 1,443', gradient 1 in 50=distance 14 miles.)
		2 4 0	3,107'0	...	...	(This line is meant to be traced along the rocky hill-side on which the new Potinghi Ghát from Ródavalsa downwards is now being constructed.)
		16 4 0	1,622'0	...	...	Foot of hills 4 miles north-west of Sálur.
		...	1,472'0	...	...	Merialpád saddle (gradient 1' in 92').
		...	...	...	...	Merialpád cutting on new Potinghi Ghát (gradient 1' in 50').
		17 1 66	17 1 66	1,620'0	...	Wou'ranghy stream; level of roadway over viaduct.
		...	2,001'0	1,249	...	Northern entrance to tunnel.
		1,622'0	...	...	...	Ródavalsa saddle.
		17 1 66	1,620'0	...	...	Southern entrance to tunnel.
		...	1,622'0	379	...	Ródavalsa tunnel (fall 852 feet; gradient 1 in 50, length 8=½ mile.)
		8 1 0	8 1 0	770'0	852	Foot of hills.
		...	3,250'0	...	...	Merialpád saddle (fall 143'; gradient 1 in 92, distance=2½ miles.)
		2 4 0	3,107'0	...	143	Merialpád cutting (on the new Potinghi Ghát.)
		...	...	...	...	(Fall 1,485', gradient 1 in 35, length 10 miles.)
	12 4 0	12 4 0	1,622'0	...	1,485	Beginning of viaduct.
		...	1,622'0	...	...	Ródavalsa tunnel.
		...	...	...	...	(Fall 852 feet, gradient 1 in 35', distance 5½ miles.)
	5 5 74	5 5 74	770'0	...	852	Foot of the hills; fall 201' (gradient 1' in 105'; length 4 miles.)
		...	...	...	...	(NOTE.—This section answers for all the ghát lines, coming down from Merialpád saddle.)
	4 0 0	4 0 0	569'0	...	201	Town of Sálur.

*Statement of Particulars describing Mr. Nordmann's route, &c. —concl.*

Distance from Vizagapatam.	Distance between Principal Stations.	Distance between Villages.	Height above M. S. L.	Rise.	Fall.	REMARKS.
M. F. Y.	M. F. Y.	Feet.	Feet.	Feet.	Feet.	
0 5 66 $\frac{2}{3}$	0 0 0	3,500' 0	1,622' 0	...	379	Southern entrance to tunnel.
		...	1,622' 0	...	...	Ródavalsa saddle.
		2,000' 0	1,622' 0	...	...	Northern entrance to tunnel.
		2,750' 0	1,472' 0	...	...	Wondranghy rock. (a)
33 0 0	33 0 0	569' 0	3,250' 0	...	...	Merialpád saddle (gradient 1 in 76).
		...	3,250' 0	...	...	Páchipenta saddle (1 in 50).
		15 0 0	2,213' 0	...	1,037	Foot of hills (1 in 105).
		29 0 0	770' 0	...	1,443	Sálur. (b)
35 6 0	35 6 0	569' 0	3,250' 0	...	201	Merialpád saddle (1 in 92).
		2 4 0	3,107' 0	...	...	Merialpád cutting.
		9 6 0	2,600' 0	...	650	Lávidy saddle (1 in 125).
		12 2 0	2,494' 0	...	...	High Súnpipenta (1 in 1 <sup>0</sup> 0).
		17 6 0	2,213' 0	...	387	Páchipenta saddle (1 in 50).
		31 6 0	770' 0	...	...	Foot of the hills (1 in 105).
29 2 66	29 2 66	569' 0	3,250' 0	...	1,644	Sálur. (c)
		2 4 0	3,107' 0	...	...	Merialpád saddle (1 in 92).
		9 6 0	2,600' 0	...	650	Merialpád cutting.
		15 2 0	2,213' 0	...	387	Lávidy saddle (1 in 75).
		29 2 0	770' 0	...	...	Páchipenta saddle (1 in 50).
23 0 67	23 0 67	569' 0	3,250' 0	...	1,644	Foot of hills (1 in 105).
		2 4 0	3,107' 0	...	...	Sálur. (d)
		16 4 0	1,622' 0	...	...	Merialpád saddle (1 in 92).
		17 1 66	1,622' 0	...	1,628	Merialpád cutting (1 in 50).
		25 2 66	770' 0	...	...	Wondranghy stream.
		29 2 66	569' 0	...	1,053	Ródavalsa tunnel (1 in 50).
17 7 98	17 7 98	2,779' 0	2,017' 0	...	...	Foot of hills (1 in 105).
		1 0 200	2,094' 0	...	...	Sálur. (e)
		1 7 125	2,061' 0	...	...	Ranigár.
		2 4 207	2,105' 0	...	...	...
		4 2 150	2,160' 0	...	...	...
		5 4 40	2,314' 0	...	...	...
		6 6 25	2,457' 0	...	...	...
		7 4 180	2,457' 0	...	...	...
		8 6 108	2,479' 0	...	...	...
		9 7 175	2,520' 0	503	...	Mastiput. (f)
		11 1 27	2,560' 0	...	...	...
		12 4 175	2,670' 0	...	...	...
		13 6 7	2,880' 0	360	...	Limka saddle. (g)
		15 0 31	2,830' 0	...	...	...
		16 6 150	2,759' 0	...	...	...
		17 7 98	2,779' 0	...	101	Near Chikapar bridge.

## XXVII.

*Statement of Particulars describing Mr. Cormac's Route from Comellypettah (via Singapore) to Lonjigar.*

Distance from Vizagapatam.	Distance between Principal Stations.	Distance between Villages.	Height above M. S. L.	Rise.	Fall.	REMARKS.
M. F. Y.	M. F. Y.	M. F. Y.	Feet.	Feet.	Feet.	
		...	703' 0	...	...	Village of Comellypettah.
		1 2 146	703' 0	...	...	Stream 50' x 9'.

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*Statement of particulars describing Mr. Cormac's Route from Comellypettah, &c.—contd.*

Distance from Vizagapatam.	Distance between principal Stations.	Distance between Villages.	Height above M.S.L.	Rise.	Fall.	REMARKS.
M. F. Y.	M. F. Y.	M. F. Y.	Feet.	Feet.	Feet.	
		1 6 26	...	...	...	Stream 30' × 10'. Sandy bed; banks well defined; country broken by ravines; low jungle.
		2 1 36	703·0	...	...	Stream 30' × 10'. Sandy bed; banks well defined; country broken by ravines; low jungle.
		...	...	...	...	Dry cultivation.
		2 7 106	723·0	...	...	Wet and dry cultivation.
		3 6 116	753·0	...	...	Ground well cultivated; generally dry.
		5 0 180	803·0	...	...	Stream 40' × 6'. Sandy bed; banks not well defined.
		5 6 157	...	...	...	Ground highly cultivated and irrigated by channels.
		6 0 142	845·0	...	...	Village of Dorabada, extensive area of wet cultivation to east. Stream 6' × 4'.
		...	...	...	...	Stream 20' × 6'. Sandy bed; banks not well defined.
	7 0 120	7 0 120	835·0	132	...	Ground highly cultivated; generally dry. Village of Rampooram.
		0 4 115	835·0	...	...	Stream 15' × 4'.
		0 7 10	...	...	...	Side lying ground, highly cultivated, partly irrigated.
		1 1 201	...	...	...	Stream 40' × 8', at bottom of ravine.
		2 0 68	817·0	...	...	Stream 15' × 4'.
		2 2 5	...	...	...	Dry cultivation to east.
		2 7 108	869·0	...	...	Saddle. Small hills on each side.
		3 0 118	826·0	...	...	Jungle village of Bejjah.
		3 1 121	869·0	...	...	Bellacondah.
		...	...	...	...	Stream 20' × 8'.
		4 1 96	835·0	...	...	Stream 12' × 6'.
		5 3 58	922·0	...	...	Stream 15' × 8'.
		...	...	...	...	Dry cultivation, village of Dammanimmah.
		6 1 36	904·0	...	...	Village of Shikarpoy away to the left.
		6 2 25	854·0	...	...	Camp near Shikarpoy.
		6 2 90	883·0	...	...	Stream 16' × 8'. Sandy bed.
		7 0 74	932·0	...	...	Village of Davalabaddy.
		7 1 15	874·0	...	...	Stream 15' × 6'.
		7 2 147	932·0	...	...	Stream 20' × 8'. Rocky bed.
		7 4 192	932·0	...	...	Village of Boodagoodah. Nagavully river parallel to road, whole width of valley cultivated.
		7 5 130	903·0	...	...	Stream 20' × 6'. Shingly bed. Valley about 2½ miles broad. Wholly cultivated; all dry.
		7 6 144	932·0	...	...	Stream 30' × 6'. Sandy bed; extensive wet cultivation; land irrigated.
		8 4 52	962·0	...	...	Temple at Narainpooram.
		9 0 53	992·0	...	...	Stream 40' × 10'.
9 1 47	9 1 47	992·0	157	...	...	Village of Koseegooda; castor-oil, hemp, linseed, gram.
	0 1 110	...	...	...	...	Stream 30' × 8', Rocky bed.
	0 3 0	...	...	...	...	Camp near Singapore. Small town of Singapore.
	0 4 88	...	...	...	...	Nagavully river, banks not well defined, 3 spans required, 40' × 12'.
	0 7 190	952·0	...	...	...	Town of Singapore, on left bank of Nagavully river; dry cultivation.
	1 1 135	...	...	...	...	
	2 2 175	992·0	...	...	...	
	2 5 110	...	...	...	...	
	3 2 24	982·0	...	...	...	
	4 0 60	1,010·0	...	...	...	
	4 1 186	972·0	...	...	...	
	4 2 146	1,010·0	...	...	...	
	5 0 80	1,012·0	...	...	...	
	5 1 166	982·0	...	...	...	
	5 2 100	1,012·0	...	...	...	
	6 2 32	997·0	...	...	...	
	7 0 80	997·0	...	...	...	
	7 0 185	992·0	...	...	...	
7 2 25	7 1 180	...	...	5	...	
	7 2 25	997	5	...	...	

*Statement of particulars describing Mr. Cormac's Route from Comellypettah, &c.—contd.*

Distance from Vizagapatam.	Distance between principal Stations.	Distance between Villages.	Height above M.S.L.	Rise.	Fall.	REMARKS.
M. F. Y.	M. F. Y.	M. F. Y.	Feet.	Feet.	Feet.	
		1 0 63	1,047' 0	...	...	Dry cultivation ; jungle recently cleared.
		2 0 0	1,057' 0	...	...	Ditto ditto.
		2 3 10	...	...	...	Dry cultivation.
		2 7 165	1,067' 0	...	...	Dry cultivation to west ; jungle to east.
						Recently cleared.
		3 7 145	1,077' 0	...	...	Sâl forest.
			1,158' 0	...	...	Bondesor and Lonjigar roads diverge from this point.
		4 3 190	1,097' 0	...	...	Palkonianah.
		4 4 160	1,037' 0	...	...	Stream 60' × 12'. Sandy bed, banks not well defined.
		4 5 150	1,097' 0	...	...	Jungle.
		5 1 96	...	...	...	Palkonianah ; extensive area under cultivation near village.
		5 2 90	1,097' 0	...	...	
		5 3 5	1,037' 0	...	...	Stream 60' × 10'. Rocky bed, banks not well defined.
		5 4 0	1,097' 0	...	...	
		5 6 69	...	...	...	Stream 20' × 6'. Jungle.
		6 1 12	1,147' 0	...	...	
			...	...	...	Dry cultivation in patches here and there.
		6 6 150	1,167' 0	...	...	Stream 20' × 6'. Stony bed.
		6 6 210	...	...	...	
		7 2 30	1,275' 0	...	...	Dense jungle.
		7 5 90	1,295' 0	...	...	Fine forest.
		8 1 60	1,355' 0	...	...	Stream 30' × 8'. Rocky bed, banks not well defined ; dense jungle.
		8 6 150	1,515' 0	...	...	Stream 30' × 8'. Rocky bed.
		9 7 145	1,515	...	...	Do. 15' × 6'.
		10 0 10	...	...	...	Do. 20' × 8'.
		10 3 35	1,565	...	...	Dry cultivation.
		10 5 115	1,602' 0	605	...	Village of Tirmui. Dense jungle.
		1 0 20	1,562' 0	...	...	Much large sâl, yegi, and matti.
			...	...	...	Fine forest.
		2 0 0	1,597' 0	...	...	
			...	...	...	Forest.
		3 0 10	1,527' 0	...	...	Small patch of cultivated ground. Forest.
		3 5 196	...	...	...	Village Narraindroog. Large area cultivated round village, principally sugarcane.
		4 4 76	1,452' 0	...	...	Wet cultivation ; some tops of mango trees.
		5 6 68	1,386' 0	...	...	Stream 40' × 12'. Bongsara river, banks well defined ; bed stony.
		6 1 190	1,396' 0	...	206	Camp near the town of Lonjigar.

**XXVIII.***Statement of particulars describing Mr. Cormac's Route from Palkonianah (near Singapore) via Mûsa Ghâl to Bogor.*

Distance from Vizagapatam.	Distance between principal Stations.	Distance between Villages.	Height above M. S. L.	Rise.	Fall.	REMARKS.
M. F. Y.	M. F. Y.	M. F. Y.	Feet.	Feet.	Feet.	
		...	1,158' 0	...	...	Near the village of Palkonianah.
		0 5 0	1,208' 0	...	...	Jungle.
		1 1 115	1,208' 0	...	...	Village of Chothopoor. Jungle.
		1 4 0	1,168' 0	...	...	Dry cultivation.
		1 4 150	1,158' 0	...	...	
		1 6 100	1,198' 0	...	...	Patches of wet cultivation.
		2 3 25	1,208' 0	...	...	Village of Moondeegoodah.
		2 4 0	...	...	...	
		2 4 110	...	...	...	San river 60' × 10', banks well defined ; bed sandy.
		2 5 145	1,198' 0	...	...	
		3 4 0	1,228' 0	...	...	Wet cultivation to east ; hills on west.

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*Statement of particulars describing Mr. Cormac's Route, &c.—contd.*

Distance from Vizagapatam.	Distance between principal Stations.	Distance between Villages.	Height above M. S. L.	Rise.	Fall.	REMARKS.
M. F. Y.	M. F. Y.	M. F. Y.	Feet.	Feet.	Feet.	
		3 7 0	1,238'0	...	...	Ghât commences.
		4 2 90	1,338'0	...	...	First saddle.
		4 5 25	1,368'0	...	...	Skirting hill side.
		5 0 30	1,468'0	...	...	Second saddle.
		5 1 0	...	...	...	.....
		...	...	...	...	Mango tope.
		5 3 140	...	...	...	Village of Bijepur. Several acres of dry cultivation near village.
		6 0 175	1,478'0	...	...	Small stream 15' x 6'. Rocky bed.
		6 1 160	...	...	...	Village of Koranmunda; extensive area of dry cultivation near village.
		6 5 10	...	...	...	Low jungle; patches of cultivation.
		7 0 100	1,528'0	...	...	Jungle, gravelly soil.
		7 4 150	1,588'0	...	...	Stream 20' x 6'. Bed gravel.
		8 6 55	1,688'0	...	...	Camp near Kundru.
		9 2 65	1,708'0	...	...	Stream 12' x 8'.
		9 4 0	1,757'0	599	...	Jungle. ....
		0 2 200	...	...	...	Head of Mûsa Ghât.
		1 0 25	1,817'0	...	...	Dense jungle.
		1 2 180	1,847'0	...	...	Forest.
		1 7 80	1,937'0	...	...	Do.
		2 0 200	2,047'0	...	...	Do.
		...	...	...	...	Do.
		2 5 40	1,667'0	...	...	Forest.
		3 2 115	1,277'0	...	...	.....
		4 1 5	1,177'0	...	...	.....
		4 7 15	1,067'0	...	...	.....
		5 2 5	1,017'0	...	...	.....
		...	...	...	...	Forest.
		6 1 40	1,010'0	...	...	.....
6 6 100	6 6 100	6 6 100	915'0	...	842	Camp at Majigaon in the jungle near a small clearing in the forest. Forest.
		0 6 50	...	...	...	Side lying ground rocky.
		0 7 120	895'0	...	...	Forest.
		...	...	...	...	Cleared to some extent.
		2 0 190	815'0	...	...	Black cotton soil, small area of wet cultivation.
		2 7 170	775'0	...	...	Jungle, forest sâl and matti.
		3 3 180	720'0	...	...	Patna river 40' x 8'; bed stony; banks not well defined.
		4 0 70	...	...	...	Soil light and sandy.
		4 7 80	745'0	...	...	Forest. Chiefly matti and sâl trees.
		5 2 100	725'0	...	...	Stream 20' x 6'. Stony bed.
		5 7 65	715'0	...	...	Forest. ....
		6 7 80	785'0	...	...	Stream 40' x 8'. Bed sandy; banks well defined.
		7 4 12	715'0	...	...	Village of Beheragura.
		8 1 0	...	...	...	Stream 18' x 6'.
		...	...	...	...	Low jungle.
		9 1 130	695'0	...	...	...
		9 2 64	...	...	...	Emerging from the town of Bondesor.
		9 5 210	695'0	...	...	Wet cultivation. ....
		10 0 132	...	...	...	Do.
		10 4 0	695'0	...	...	Stream 12' x 6'. Sandy bed, banks not well defined.
		11 1 0	705'0	...	...	Stream 9' x 6'.
11 3 140	11 3 140	11 3 140	729'0	...	186	Do. 18' x 6'. Stony bed.
		0 6 80	739'0	...	...	Open country, well cultivated.
		1 1 60	...	...	...	A large area under sugar cane.
		...	...	...	...	.....
		2 2 0	729'0	...	...	Well-cultivated ground.
		2 5 20	...	...	...	Village of Bijepur.
		2 6 0	...	...	...	Abandoned fields and deserted village.
		3 2 50	727'0	...	...	Stream 20' x 6'. Sandy bed, banks not well defined.
		3 4 20	...	...	...	Town of Dadpur.
		4 7 110	727'0	...	...	Stream 12' x 8'. Wet cultivation to east.
		5 6 170	667'0	...	...	Cultivation in patches here and there.
		6 4 60	637'0	...	...	.....
		7 4 0	597'0	...	...	.....
		7 4 45	597'0	...	...	.....
		0 4 0	597'0	...	...	.....
		1 0 40	597'0	...	...	.....

*Statement of particulars describing Mr. Cormac's Route, &c.—contd.*

Distance from Vizagapatam.	Distance between principal Stations.	Distance between Villages.	Height above M. S. L.	Rise.	Fall.	REMARKS.
M. F. Y.	M. F. Y.	M. F. Y.	Feet.	Feet.	Feet.	
		2 2 66	597'0	...	...	Village of Karriky, surrounding country all waste land.
		3 2 140	637'0	...	...	Side lying ground.
		3 5 70	590'0	...	...	Low saddle.
		4 5 10	548'0	...	...	Dry cultivation.
		...	...	...	...	River 80' x 15'. Sandy bed, banks well defined.
		13 4 215	6 0 170	558'0	...	Ground more or less rocky.
		1 1 194	558'0	...	171	Low lying ground; rice fields.
		2 3 30	558'0	...	...	Village of Komari.
		2 4 0	550'0	...	...	Patches of wet cultivation.
		3 2 70	560'0	...	...	Cultivated; surrounded by partially cleared jungle.
		4 1 20	560'0	...	...	Do. do.
		...	...	...	...	River 50' x 6'. Stony bed, banks not well defined.
		5 4 0	600'0	...	...	About 6 acres of wet cultivation near Jujrang; long grass.
		6 1 100	600'0	...	...	Small patches of cultivation in partially cleared jungle.
		7 0 152	600'0	...	...	Jungle partially cleared; kunkur limestone in abundance.
		8 4 70	608'0	...	...	Village of Uthekela.
		9 1 130	538'0	...	...	High grass jungle.
		10 1 150	628'0	...	...	Village of Boria. Wet cultivation to east.
		10 7 150	608'0	...	...	River. Ret Noi (250 x 15).
		11 7 105	620'0	...	...	High ground all cleared; patches of cultivation here and there.
		13 0 0	608'0	...	...	Village of Borimpodor; dry cultivation near.
		13 2 20	628'0	70	...	Village of San-kesinga; dry cultivation near.
						Camp at Bogor. ....

**XXIX.**

*Statement of Particulars describing Mr. Cormac's Route from Raipur (via Dhamtari) to Omorkot distance 150½ miles.*

Distance from Raipur.	Distance between Principal Stations	Distance between Villages.	Height above M.S.L.	Rise.	Fall.	REMARKS.
M. F. Y.	M. F. Y.	M. F. Y.	Feet.	Feet.	Feet.	
		...	963'0	...	...	Raipur; near the Deputy Commissioner's Office. Town of Raipur. Large tank.
		1 0 180	972'0	...	...	Just outside Raipur; near the cemetery. Tank. Road branches off east to Rajia. Native Infantry Rifle Range. Uncultivated land.
		2 5 156	952'0	...	...	Village of Boria Khoord. Large tank and fine tamarind trees; stream 12' x 8'; bridged. Wheat and linseed cultivation.
		3 4 130	912'0	...	...	Stream 24' x 8'; bridged; sandy bed and well-defined clay banks. Avenues planted. Wheat and linseed cultivation.
		5 2 200	892'0	...	...	Stream bridged. Wheat and linseed cultivation. Stream 20' x 6'.
		7 1 20	902'0	...	...	Village of Amdul. All linseed cultivation. Stream 24' x 7'. Linseed cultivation.
		8 5 96	940'0	...	...	Tappal huts and well (steined) of water; fair camping ground; no shade. Stream 50' x 9'.
		9 3 40	930'0	...	...	Village of Kolar. All cultivated ground.
		10 2 200	980'0	...	...	Stream 48' x 8'; sandy bed; good banks.
11 7 71	11 7 71	11 6 170	...	7	...	Village of Khorpa. All ground under linseed cultivation.
		11 7 71	970'0	7	...	
		1 1 140	970'0	...	...	
		1 5 40	970'0	...	...	

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*Statement of Particulars describing Mr. Cormac's Route from Raipur, &c.—contd.*

Distance from Raipur.	Distance between Principal Stations.	Distance between Villages.	Height above M.S.L.	Rise.	Fall.	REMARKS.
M. F. Y.	M. F. Y.	M. F. Y.	Feet.	Feet.	Feet.	
		2 3 200	980'0	...	...	Village of Bhutgaon. All ground under cultivation. Stream 10' × 6'.
		3 7 190	970'0	...	...	Village of Rakhi. All land under linseed and wheat.
		4 7 68	950'0	...	...	Stream 60' × 9'; Clay bed; well-defined banks; slightly undulating.
		6 2 170	930'0	...	...	Village of Kuchna. Stream 8' × 4'; good topes near villages.
		7 4 50	910'0	...	...	Stream 89' × 14'; gravelly bed; good banks. Village of Kanamuka.
21 1 77	9 2 6	9 2 6	1,020'0	50	...	Village of Silturra. Camping ground not good. No good water. All open country; fully cultivated. Linseed cultivation.
		1 3 80	1,110'0	...	...	Village of Singdehi on east.
		...	...	...	...	Village of Supela on west.
		2 4 0	984'0	...	...	Linseed cultivation. Country nearly flat.
		2 7 0	980'0	...	...	Rice-fields.
		4 0 50	990'0	...	...	Stream 33' × 7'; sandy bed; good banks. Castor-oil cultivation.
		5 4 6	1,000'0	...	...	Village of Bhukara; 300 houses, Police station, school-house, tanks. Two acres laterite rock on surface; young mango topes; avenue all margosa trees.
29 6 13	8 4 156	7 4 110	1,000'0	...	...	Open, flat country; rice-fields. Rice-fields.
		8 4 156	1,040'0	20	...	Village of Gujra; 80 huts. Residence of a Malukdar. Four good tanks. Cultivated land. Soil black clay.
		1 0 0	1,061'0	...	...	Village of Doma. All cultivated land.
		1 5 130	1,061'0	...	...	Rice-fields. Soil black clay.
		...	...	...	...	Village of Kurmataraye. Small stream 6' × 3'.
		3 0 0	1,026'0	...	...	All cultivated lands. Soil black clay.
		4 2 70	1,012'0	...	...	Village of Demar. Rice-fields. Soil black clay.
		5 2 156	1,019'0	...	...	Rice-fields. All cultivated land; some linseed and wheat crops.
		6 2 176	1,005	...	...	Rice-fields.
		7 0 58	998'0	...	...	Village of Arjuni.
		7 5 178	1,000'0	...	...	Village of Buthena. All land cultivated, linseed and wheat; mango and tamarind topes; garden cultivation. Entering town of Dhamtarilargetank and temple. Sandy soil.
		...	...	...	...	Town of Dhamtari; about 5,000 houses; 12,000 to 15,000 inhabitants. Tahsildar's Cutcherry, Police station, hospital, and school.
39 5 138	9 7 125	9 7 125	1,000'0	...	40	Good camping ground; good water; fine topes of mango and tamarind trees. Camp outside town of Dhamtari. Mango and tamarind topes. Sandy soil. Cultivated land; linseed, wheat, Bengal gram.
		...	...	...	...	Sandy soil.
		2 0 115	1,060'0	...	...	Rice-fields.
		2 5 0	...	...	...	Village of Roodree. Large numbers of mango, matti, and ippa trees.
		2 6 160	...	...	...	Rice-fields.
		3 5 70	1,030'0	...	...	Rocky ground.
		5 3 130	1,030'0	...	...	Stream 24' × 6'; clay bed; banks not well defined; jungle. Patches of clearing and cultivation. Track parallel to the Mahá-nadi river.
		6 3 57	...	...	...	Village of Murradeo. Small village with a little cultivation near it. Scrub jungle with patches of cultivation. Soil stony. Jungle patches of wet and dry cultivation here and there.
		...	...	...	...	Soil stony. Village of Gangrel.
		...	...	...	...	Mahá-nadi river; 1,449' × 17'; sandy bed; left bank well-defined clay.

*Statement of Particulars describing Mr. Cormac's Route from Raipúr, &c. —contd.*

Distance from Raipur.	Distance between Principal Stations.	Distance between Villages.	Height above M.S.L.	Rise.	Fall.	REMARKS.
M. F. Y.	M. F. Y.	M. F. Y.	Feet.	Feet.	Feet.	
		6 5 100	...	...	...	Cleared ; patches of cultivation.
		7 2 6	1,000' 0	...	...	Village of Kokri ; small village ; stratified gneiss rock on surface. Rice-fields. Jungle. Clearing along the track.
		8 4 68	1,000' 0	...	...	Ippa, matti, and some small teak trees.
		9 4 8	1,030' 0	...	...	Villages of Batrel on west. Koralma on east. Stream 24' × 8'. Stream 620' × 8'.
		11 1 55	1,090' 0	...	...	Village of Lamkeni. Large area of cultivated land round village. Hill ridges on each side thickly wooded.
52 2 98	12 4 180	12 4 180	1,150' 0	150	...	Village of Dargahan. Police Station. Large area of rice-fields. Swampy rice-fields.
		0 7 10	1,169' 0	...	...	Village of Sunghola on rising rocky ground. Small rocky hill in rear. Garden cultivation ; rice-fields.
		1 4 58	1,169' 0	...	...	Village of Bhirawun. Small hills near village. Dry cultivation. Soil black clay.
		2 4 140	1,169' 0	...	...	Village of Mogragahan. Large area of rice-fields near village. Ippa trees abundant.
		3 3 100	1,169' 0	...	...	Stream 24' × 8'. Sugarcane plantation. Stream 20' × 6'.
		4 0 30	1,226' 0	...	...	Swampy ground. Village of Alva, first in Kankér State. Dry cultivation near village. Waste land ; high grass ; ippa trees. Waste. Ippa trees abundant. Jungle.
		6 3 80	1,359' 0	...	...	Gravelly soil. All jungle, scrub, with ippa trees. Stream 30' × 8'. Clay bed and banks. Stream 18' × 6'. Clay bed and banks.
		7 5 80	1,359' 0	...	...	Village of Charima. Patches of cultivation here and there. Stream 18' × 6'. Sandy bed. Jungle clearing.
62 4 182	10 2 84	10 2 84	1,300' 0	150	...	Village of Polawai. Uncultivated land. Swampy ground. Rice-fields.
		0 5 3	1,280' 0	...	...	Topes of young mango trees.
		0 7 186	1,280' 0	...	...	Village of Sawada. One square mile rice-fields.
		1 4 70	...	...	...	Stream 40' × 7'. Clay bed and banks. Rice-fields.
		2 0 150	...	...	...	Village of Kurna.
		2 3 125	1,220' 0	...	...	Mahánadi river. Open country. Some rice-fields.
		2 5 72	...	...	...	Half cultivated, half jungle.
		3 7 90	1,260' 0	...	...	Jungle. Sandy soil.
		4 6 180	1,310' 0	...	...	Jungle. Numerous ippa trees.
		5 7 0	1,300' 0	...	...	Jungle.
		6 7 0	...	...	...	Makree river, 150' × 12'. Sandy bed ; clay banks. Rice-fields.
		7 0 60	...	...	...	Village of Berawai. Jungle ; numbers of ippa trees.
		7 2 190	1,270' 0	...	...	Jungle.
		8 6 0	1,320' 0	...	...	Town of Kankér.
		9 7 58	1,300' 0	...	...	Duhd river, 115' × 8'. Sandy bed ; clay banks. Town of Kankér to west.
		10 1 60	1,280' 0	...	...	Camp, beyond Kankér.
73 4 12	10 7 50	10 7 50	1,310' 0	10	...	Jungle.
		1 5 0	1,344' 0	...	...	Some clearing and small area of rice-fields. Kankér limestone about.
		2 3 0	1,327' 0	...	...	Jungle, very dense ; no large trees. Matti trees.
		2 7 0	...	...	...	Hatkul river. Ground somewhat broken. Undulating ground.
		3 6 0	1,310' 0	...	...	Stream 40' × 9'. Sandy bed ; well-defined banks.
		4 0 210	1,344' 0	...	...	Village of Kongera ; a few wretched huts. About 8 acres rice-fields. Jungle.
		5 2 33	1,361' 0	...	...	Stream 40' × 10'. Amordorgi. Sandy bed ; clay banks ; well defined.
		5 6 44	1,327' 0	...	...	.....
		6 4 6	1,378' 0	...	...	.....

*Statement of particulars describing Mr. Cormac's Route from Raipúr, &c.—contd.*

Distance from Raipúr.	Distance between principal Stations.	Distance between Villages.	Height above M.S.L.	Rise.	Fall.	REMARKS.
F. M. Y.	F. M. Y.	F. M. Y.	Feet.	Feet.	Feet.	
83 0 147	9 4 135	7 4 210	1,429'0	...	...	Jungle. Village of Aravail. Large clearing; extensive rice-fields.
		8 2 174	1,412'0	...	...	Hatkul river (117' x 14').
		8 5 140	1,497'0	...	...	In jungle sál, matti, ippa trees.
		9 4 135	1,520'0	210	...	Camp in jungle near Salabat.
		0 1 100	1,470'0	...	...	Hatkul river bed.
		0 6 146	1,480'0	...	...	Do. Sandy with cross ridges of rock at intervals. On river banks, through low scrub jungle.
		2 0 83	1,480'0	...	...	Village of Chiprail. Forest good; large timber trees.
		2 7 180	...	...	...	Forest.
		3 3 0	...	...	...	Do.
		4 0 10	1,510'0	...	...	.....
		4 6 90	1,520'0	...	...	Fine forest.
		6 0 60	1,550'0	...	...	Cross section nearly level. Bamboo jungle.
		7 2 86	1,610'0	...	...	Bamboo jungle.
		7 5 0	1,710'0	...	...	Do.
		...	...	...	...	Junction of two streams. Rocky bed.
		8 0 0	1,800'0	...	...	Much pink colored quartz.
		9 0 0	1,870'0	...	...	.....
		9 6 140	2,030'0	...	...	Gneiss of various colors. Waterfall about 25 feet in height.
94 3 37	11 2 110	11 2 110	2,130'0	160	...	Rocky bed in river.
		1 4 186	2,122'0	...	...	Junction with small stream from Síduwan. Sál jungle with undergrowth. Sál jungle.
		2 4 82	2,098'0	...	...	Sál jungle. Clearing.
		2 7 104	2,122'0	...	...	Village of Siduwan. Large clearing. Rice-fields. Swampy ground. Sál jungle. A few large trees, sál and matti.
		4 3 116	2,146'0	...	...	Swampy ground. Rice-fields.
		5 0 130	2,106'0	...	...	Stream 30' x 7'. Sandy bed; well-defined clay banks.
		5 5 0	2,122'0	...	...	Soil sandy, brown clay. Village of Koragaon; a few miserable huts. Sál jungle.
		7 1 126	2,092'0	...	...	Sál jungle. Soil sandy, brown clay; clearing.
		8 6 12	2,074'0	...	...	Small stream dammed up for rice cultivation.
		9 4 200	2,060'0	...	...	Village of Kalgaon. Much gneiss rock cropping up. Sál jungle.
		10 0 210	2,022'0	...	...	Sál jungle and date shrub; undergrowth. Stream 12' x 6'.
		10 5 90	2,022'0	...	...	Village of Tumripara.
		11 3 16	2,046'0	...	...	Jungle; small sál.
		12 5 36	2,030'0	...	...	Village of Kajran. Garden cultivation; castor-oil trees, plantains and melons.
108 6 47	14 3 10	14 3 10	2,070'0	...	60	Rice-fields.
		1 2 96	2,050'0	...	...	Stream 50' x 10'. Sandy bed; clay banks. Baordhig river. Rice-fields.
		2 3 46	2,040'0	...	...	Stream 18' x 6'. Rice-fields.
		2 4 136	2,060'0	...	...	Village of Liagaon, a large village; extensive clearing. Garden cultivation. Rice-fields.
		4 2 110	2,050'0	...	...	Stream 82' x 18'. Sandy bed; clay banks; well defined. Swampy land. Rice-fields.
		5 1 20	2,030'0	...	...	Village of Banskot; low jungle. Date shrubs.
		7 1 70	2,060'0	...	...	Small sál. Jungle swamp. Rice-fields.
		9 2 40	2,060'0	...	...	Soil black clay.
119 6 207	11 0 160	11 0 160	2,100'0	130	...	Village of Dodra. Jungle.
						Jungle; small sál.
						Village of Simora. Small area of rice-field.
						Stream 22' x 12'. Sandy bed; well-defined banks. Village of Tunda. Sugar-cane and castor-oil tree cultivation. Two iron smelting furnaces at work.
						Village of Kudi in a small clearing.
						Sál forest; large trees.
						Village of Paorbel; not a good camping ground. Sál jungle; much undergrowth.
						Smaller village of Paorbel.

*Statement of particulars describing Mr. Cormac's Route from Raipúr, &c.—contd.*

Distance from Raipúr.	Distance between principal Stations.	Distance between Villages.	Height above M.S.L.	Rise.		REMARKS.
				M. F. Y.	M. F. Y.	
				Feet.	Feet.	
129 5 167	9 6 180	1 1 180	2,070'0	...	...	Fine camping ground. Garden cultivation and rice-fields; sál jungle.
		2 0 0	2,110'0	...	...	Stream 20' x 7'. Sál jungle; open clearing.
		3 3 170	2,160'0	...	...	Sál jungle.
		3 6 200	2,170'0	...	...	Village of Odepur. Garden cultivation; rice-fields; sál jungle; swampy ground.
		6 0 20	2,140'0	...	...	Sál jungle. Village of Mohundi.
		6 3 200	2,090'0	...	...	Stream 24' x 6'. Rocky bed; clay banks. Smaller village of Mohundi. Sál jungle.
		8 1 40	2,100'0	...	...	Sál jungle.
		9 6 180	2,130'0	30	...	Village of Gunjinga. Jungle; soil black clay.
		1 2 0	2,090'0	...	...	Sál forest; large trees.
		1 5 100	2,070'0	...	...	Stream 18' x 8'. Sandy bed; clay banks; scrub jungle.
		2 2 0	2,065'0	...	...	Stream 58' x 9'. Rocky bed and banks; jungle.
		3 2 20	2,060'0	...	...	Stream 40' x 8'. Rocky bed and banks; jungle.
		4 2 160	2,050'0	...	...	Stream 20' x 8'. Rocky bed and banks.
		5 4 0	2,120'0	...	...	Village of Kurulubahal; excellent camping ground and good shade. Extensive rice-fields and garden cultivation. Soil quartz gravel. Forest of sál.
		6 6 145	2,135'0	...	...	Village of Serapur in a small clearing.
		8 1 75	2,140'0	...	...	Jungle; sál with date shrub undergrowth.
		9 7 200	2,120'0	...	...	Jungle; side lying ground.
		10 4 26	2,100'0	...	...	Jungle; small sál trees.
141 4 147	11 6 200	11 6 200	2,080'0	...	50	Clearing.
		0 5 100	2,056'0	...	...	Village of Bakuda in a small clearing; jungle.
		1 5 165	2,068'0	...	...	Stream 90' x 12'. Sandy bed; clay banks.
		2 1 20	2,156'0	...	...	In jungle.
		3 6 110	2,056'0	...	...	Stream 68' x 10'. Rocky bed and banks. Large area of rice-fields; swampy.
		4 7 10	...	...	...	Village of Bamini; excellent camping ground.
		5 0 20	2,060'0	...	...	Tobacco, castor-oil trees, plantains; clearing.
		5 7 0	2,068'0	...	...	Stream 18' x 9'.
		6 2 130	2,044'0	...	...	Village of Barhona. Ippa, mango, and fig trees.
		7 4 100	2,028'0	...	...	Stream 18' x 12'.
150 3 202	8 7 55	8 7 55	2,021'0	...	59	Village of Birondi; large area of rice-fields; good camping ground.
						Village of Kochtiamo; tank and irrigation channel; area of rice-fields. Village of Omorkót.
						Camp.

## XXX.

*Statement of particulars describing Mr. Cormac's Route from Pupagáon (vía Jeypur) to Kuraputi.*

Distance from Pupágaon.	Distance between principal Stations.	Distance between Villages.	Height above M.S.L.	Rise.		REMARKS.
				M. F. Y.	M. F. Y.	
				Feet.	Feet.	
		0 3 160	1,981'0 1,963'0	...	...	Camp near Pupagáon. Stony soil.
		1 6 184	1,951'0	...	...	Village of Pupagáon. Topes of mango and tamarind trees. Swampy rice-fields.
		3 1 4	1,918'0	...	...	Stream 30' x 8'. Swampy rice-fields.
						Village of Dangragaon; 10 houses, 50 people. Rice-fields; swampy ground; sál jungle; jack, ippa, and matti trees.
						Village of Dondasanogoda on east; soil sandy. Rice-fields.

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*Statement of particulars describing Mr. Cormac's Route from Pupagáon (via Jeypur) to Kuraputi—concluded.*

Distance from Pupagáon.	Distance between principal Stations.	Distance between Villages.	Height above M.S.L.	Rise.	Fall.	REMARKS.
M. F. Y.	M. F. Y.	M. F. Y.	Feet.	Feet.	Feet.	
4 2 200			1,903'0	...	...	Stream 40' x 11'. Good banks; clay bed. Rice-fields.
4 7 94			1,933'0	...	...	Village of Randapali; 10 houses; mango and tamarind topes; good tank of water. Rice-fields.
6 2 20			1,891'0	...	...	Potra stream, 120' x 14'. Sandy bed; clay banks; mango tope. Rice-fields.
7 0 28			1,923'0	...	...	Village of Umerigaon; 60 houses; join road from Boriguma to Jeypur. Stream in swampy ground.
7 6 56			1,935'0	...	...	On high ground; jungle stream 12' x 8'. Wet cultivation to east, jungle to west.
8 7 110			1,929'0	...	...	Scrub jungle; large tank to the right.
9 7 160			1,937'0	...	...	Opposite travellers' bungalow; mango tope; tank.
10 4 20	10 4 20		1,955'0	...	26	Camp near Jeypur. Town of Jeypur; mango tope.
	0 5 0		1,955'0	...	...	Join road from Jeypur to Kuraputi; ground rocky; side lying; jungle on both sides.
	1 1 80		2,015'0	...	...	Jungle; hills on three sides. Stream 6' x 6'; stream 9' x 6'.
	1 5 160		2,015'0	...	...	Jungle stream 12' x 6'.
	2 0 20		1,979'0	...	...	Stream 63' x 14'. Rocky bed; clay bed.
	2 4 70		2,003'0	...	...	Stream 6' x 4'. Ravine and stream on right.
	2 7 120		2,207'0	...	...	Skirting hill side. Stream 6' x 4'.
	3 2 160		2,351'0	...	...	Jungle; ravine on right.
	3 6 56		2,267'0	...	...	Jungle.
	4 2 140		2,589'0	...	...	Jungle; hill side cutting.
	4 5 170		2,781'0	...	...	.....
	5 1 0		2,889'0	...	...	Jungle.
	5 5 54		2,805'0	...	...	Clearing.
	6 1 160		2,867'0	...	...	Undulating ground.
	6 3 160		2,915'0	...	...	Village of Bogeopodor. Some cultivated ground along sides of streams. Stream 12' x 6'.
	7 3 0		2,795'0	...	...	Village of Deoghati to the west; open cleared country.
	8 1 0		2,843'0	...	...	Good trees about. ....
	8 5 70		2,939'0	...	...	Open cleared country. ....
	9 3 100		2,831'0	...	...	Cross road to Matsura.
	10 0 0		2,891'0	...	...	.....
	...		...	...	...	Open country with sal jungle here and there.
	10 5 60		2,903'0	...	...	Good shady trees at intervals.
	11 2 110		2,915'0	...	...	Village of Damiguda.
	12 0 20		2,999'0	1044'0	...	Saddle overlooking Kuraputi.
	12 3 110		2,924'0	...	...	.....
	12 7 156		2,864'0	...	...	Kuraputi.
13 3 14	13 3 14		2,900'0	...	99	Agent's bungalow.

XXXI.

*Explanation of Vernacular Terms used in these Papers.*

Vernacular Name.	English Name.	Botanical Name.	REMARKS.
Alsi, sersá.	Linseed.	Linum usitatissimum	Alsi, <i>Hind.</i> ; sersá, <i>Tel.</i>
Babool.	A species of acacia.	Acacia Arabica	Kuruveylam, <i>Tam.</i> ; tum-machettu, <i>Tel.</i>
Bandáfrachettu.	.....	Hymenodictyon excelsum	.....
Bendakoi.	Esculent okro.	Hibiscus esculentus	Also called bhindi, <i>venday</i> .
Bhér, beri bair.	Jujube tree.	Zizyphus jujuba	Elendie, <i>Tam.</i> ; reygoo, <i>Tel.</i>
Bora, bhora.	Mangrove.	Dolichos catjang	Bora, <i>Beng.</i>
Chenna.	Bengal gram.	Cicer arietinum	Chena, <i>Guz.</i>
Cholum, <i>Tam</i> .	Great millet.	Sorghum vulgare	Jonna, <i>Tel.</i> ; jowari, <i>Beng.</i>

## Explanation of Vernacular Terms used in these Papers—concluded.

Vernacular Name.	English Name.	Botanical Name.	REMARKS.
Cumboo . . . . .	A small kind of millet . . . . .	Momordica charantia . . . . .	Combu pagulkai, <i>Tam.</i>
Dhol . . . . .	A kind of lentil . . . . .	Cajanus indicus . . . . .	Dhal, <i>Hind.</i>
Ganja, or janam nara. . . . .	Indian hemp . . . . .	Cannabis sativa . . . . .	Ganjar, <i>Beng.</i> ; bhang, <i>Hind.</i>
Guntalu . . . . .	A kind of grain . . . . .	Pencillaria spicata . . . . .	Gantelu, <i>Tel.</i>
Ippa, or ippie, or mhówa . . . . .	A fruit tree, with hard wood. . . . .	Bassia latifolia, Roxb. . . . .	The flowers yield toddy, and the seeds oil.
Ianam nara . . . . .	Hemp . . . . .	Cannabis sativa . . . . .	<i>Vide</i> ganja.
Kerda, or kendoo, <i>Hind.</i> . . . . .	Ebony . . . . .	Diospyros melanoxylon . . . . .	Tumica, <i>Tel.</i>
Korralu, or korra . . . . .	A kind of grain . . . . .	Panicum italicum . . . . .	Korralu is the plural of korra.
Matti, <i>Can.</i> , or sája, <i>Hind.</i> . . . . .	A good timber tree, wood dark brown. . . . .	.....	Madhichettu, <i>Tel.</i>
Moorum . . . . .	A kind of soil . . . . .	.....	.....
Myrabolams . . . . .	Gallnuts . . . . .	.....	.....
Nara, or janam nara . . . . .	Hemp . . . . .	Cannabis sativa . . . . .	<i>Vide</i> ganja.
Picota or pakota, <i>Portu-guese.</i> . . . . .	A machine used for raising water. . . . .	.....	.....
Pipul, pipal . . . . .	A species of ficus . . . . .	Ficus religiosa . . . . .	A sacred tree.
Ragi, or ragee . . . . .	A small food grain . . . . .	Eleusine stricta, or coracana. . . . .	Nacheni, <i>Hind.</i>
Sál, sarái, salo . . . . .	A good timber tree . . . . .	Shorea robusta . . . . .	Sal, <i>Hind.</i> and <i>Beng.</i>
Sámalu, <i>Tel.</i> . . . . .	A small food grain . . . . .	Panicum miliaceum . . . . .	.....
Son, <i>Hind.</i> . . . . .	Hemp . . . . .	.....	.....
Yerrakallu . . . . .	Red garnets . . . . .	.....	.....

BELLARY,  
28th August 1882.K. F. NORDMANN,  
Executive Engineer.

No. 2367 W., dated 13th September 1882.

From—The Secretary to the Government of Madras, Public Works Dept.,  
To—The Secretary to the Government of India, Public Works Dept.

With reference to your letter No. 692 B.C., dated 12th August 1882, on the subject of the report of the results of the reconnaissance undertaken with a view to decide the best line for a Railway between the littoral of Vizagapatam and Raipur in the Central Provinces, I am desired by the Right Honourable the Governor in Council to express regret at the delay which has occurred in laying the results before the Government of India. The following explanation will show that this has been unavoidable. Owing to the numerical weakness of the establishment, the officer who conducted the investigations had, immediately on his return from Vizagapatam, to be placed in executive charge of a division, and in addition he had temporarily to carry on the current duties of the Superintending Engineer, so that he had no time to elaborate his original reports which were necessarily submitted in the first instance in a somewhat crude form. In consequence the task of passing the reports through the press, correcting the proofs, and calculations of altitudes, marking the routes, and preparing detailed statements in a tabular form of the particulars given on the various sections, devolved on the Chief Engineer's Office, already overburdened with the current work of the department. The papers had afterwards to be sent to Bellary, in view to their final revision by Mr. Nordmann, from whom they have just been received.

2. In order to avoid further delay, I am directed to forward herewith copies

of the printed reports, &c., together with a brief note thereon by the Consulting Engineer to this Government. In doing so, I am to explain that the papers in question are now under the consideration of this Government, and that their views thereon shall be forwarded at the

Introduction to the Reports.

Letter from Mr. Nordmann No. 14 R., dated 16th November 1881.

Letter from Chief Commissioner, Central Provinces, P. W. D., No. 9059, dated 16th November 1881.

Letter from Mr. Nordmann No. 190, dated 26th November 1881.

Do. do. " 20 B., dated 4th December 1881.

Do. do. " 24 R., dated 6th January 1882.

Do. do. " 27 R., dated 14th January 1882.

Do. do. " 38 R., dated 25th February 1882.

Do. do. " 69 W., dated 30th March 1882.

Do. do. " 72 W., dated 14th April 1882.

Do. do. " 74 W., dated 18th April 1882.

Statement of particulars and sections, &amp;c.

Route map.

Brief note by Consulting Engineer (See page 1653.)

earliest possible date.

*Note on proposed Railway to connect the Vizagapatam Sea-board with Raipúr in the Central Provinces.*

A preliminary reconnaissance of the country to be traversed was made during the cold season of 1881-82 by Mr. K. F. Nordmann, who examined several routes which had been suggested.

2. Mr. Nordmann concluded his examinations by stating that two routes distinctly commended themselves to him as being equally eligible—

- (1) East of the Noagarh hills, passing near Párvatipur, Bissemkattak, Ombadóla, Asurgor, Kariál, Nara, and Arang.
- (2) West of the Noagarh hills, passing near Sálur, Merialpád, Nárangpur, Omorkót, Raigarh, Risgáon, Kárti, and Rájim.

3. Mr. Nordmann started on his reconnaissance along the eastern route, and returned from Raipúr to the coast along the western route. The following notes, extracted from his reports, are given in the direction in which each march was made.

EASTERN ROUTE.

Starting from Vizagapatam, the line proceeds *via* Bimlipatam, Vizianagram, and Ramabhadrapuram to Párvatipur, 85 miles north of Vizagapatam and 395 feet above mean sea level. It then crosses the Narrainputnum river, where a waterway of 256 feet will be required, and enters the valley of the Nagavully (or Chicacole) river, in which it runs up to Ryaguddah, 687 feet, the distance being 116 miles. The line here keeps always within half-a-mile or so of the river bank.

From Ryaguddah the line passes through a fine upland country, crossing a river 363 feet wide at the 122nd mile. To the north of the river the upland valley continues as before to Gingerabadi, 736 feet, and proceeds to Ballingy 1,136 feet, and Satikona 1,346 feet, where the summit level of the line is reached. The ground then descends to Bissemkattak, 1,154 feet (146 miles). From Bissemkattak the line proceeds to Kordaband (158 miles) with a rise of 38 feet, attaining the height of 1,192 feet at this place.

After leaving Kordaband the line crosses several small streams, and passing through a gorge with dense jungle it then descends to flat ground, and following up the course of the Bongsara river, crosses above the junction with the Ombadola river at a point requiring a waterway of 210 feet, rock being available for a foundation. Ombadola (170 miles) is then reached, the height being 1,196 feet.

The route from Ombadola northwards as far as Bogor (205 miles) is an easy one. The only approach to anything like a ghát is a decline which begins on the water-shed, 1,234 feet above mean sea level,  $3\frac{1}{2}$  miles north of Ombadola. This ghát Mr. Nordmann states can easily be worked out at a gradient of 1 in 100.

At Bogor (205 miles, height 627 feet) the Tel Nadi is crossed. The river is 1,560 feet wide between the banks; on one bank there is rock visible. The line then follows the course of the Sondor river, *via* Balipodor, Badbeng, Tukla, Karial, Kaluiga, and Kumuna to Tobor (272 miles), which is 949 feet above mean sea level.

The line then passes a low water-shed, and proceeds through some dense jungle *via* Kandamuri, Siagori (290 miles), and Jalbal; whence proceeding *via* Nara, Surumal, Kopli, Patripali, Telebanda, and Mahasamund (339 miles) to Gorari 810 feet, where the Mahanadi is crossed. The width of the river here is 2,040 feet, and the bed sandy. On the eastern bank and in the bed is limestone rock; on the west bank none is visible. After crossing the Mahanadi the line continues to Arang (350 miles) and follows the Sumbalpur road to Raipur (372 miles). Height 962 feet.

The ground traversed all the way from Jalbal to Raipúr is described as being practically almost level, the slopes easy, and the maximum gradient 1 in 100.

WESTERN ROUTE.

From Raipur, 963 feet, the line traverses a well-cultivated country to the south *via* Khandwa to Rajim (25 miles) where the Mahánadi is crossed, the

river being 1,908 feet broad at this place. The line then follows the right bank of the Pairi river. The ground traversed is described as being on the whole very favourable, and the country fully cultivated as far as and beyond Kopra, 35 miles from Raipur. The gradients are generally light. Still keeping close to the Pairi river, the line proceeds to Bourka (47 miles, height 992 feet) where some hill-side cutting will be required for upwards of a mile along the steep and stony banks of the river. Some of the heaviest work along the line will be necessary here.

Proceeding to Karti (52 miles) the line here crosses to the left bank of the Pairi river at a place 1,530 feet wide, and continues along the right bank of the Sondor river *via* Baltema 1,295 feet, and Tumaribahal to Karku, where it crosses the Bog river, 50 feet wide, and proceeds due south to Risgaon (104 miles), Gourgaon, and Hathgaon (112 miles).

The ascent up to Hāthgaon (1,870 feet above mean sea level) is a very gradual one. From this place the final ascent to the Jeypur plateau commences. A total height of 220 feet has to be overcome, which, distributed over five miles, gives a gradual rise of 44 feet per mile, or 1 in 120. The line passes through many miles of magnificent forest, and continues *via* Kolaipodor, Raigarh, and Bera to Omorkot, 137 miles from Raipur. From Omorkot the line, trending to the south-east, passes Bijapur (155 miles), Dobgaon, Paparhandi, and Narangpur (185 miles) to Ranigar (210 miles), at the foot of the Madeoputi Ghāt, tapping a rich and beautiful upland country, with fertile soil, and fine forest and jungle, at an average elevation of 1,900 feet. The surface in most parts is level.

The line then continues *via* Madcoputi and Mastiput (220 miles, height 2,520 feet) up to Dengagura, on the Kuraputi plateau (223 miles, height 2,900 feet).

From Dengagura the line gradually ascends to Dumraput (2,799 feet), and proceeds thence *via* Chikapor to Doliamb, along a 3,000 feet plateau. The ground here undulates considerably, but an easy line can be obtained by keeping along the low ground, and following the course of the longitudinal valleys leading in the direction of the line. Some high embankments would be required, but not much cutting. The line then continues to the Dokrigat Saddle (3,190 feet); after passing which it turns due east over the Merialpad Saddle (3,250 feet), passes Dobata (2,600 feet) and the Rodavalsa Saddle (2,001 feet)—a viaduct and tunnel being here required—and proceeds thence to Salar, 570 feet. The descent from the Merialpad Saddle to the plains is somewhat abrupt, the heavy fall of 2,680 feet having to be encountered within some 20 or 30 miles, according to the line chosen.

The entire length of the western route from Raipur to Vizagapatam will vary from 356 to 343 miles.

4. When the proposal was first made by the Madras Government for the survey of a line of railway to connect the Vizagapatam sea-board with the Central Provinces, Raipur was named as the point to be made for, as it was understood that a railway was then being constructed between Nagpur and Raipur. The conditions affecting the proposal have, however, been greatly modified by the investigations which have been subsequently made with the object of connecting the East Indian Railway at Sitarampur with the Nagpur-Chattisgarh Railway at Belaspur; and it will probably be now considered open to question whether Raipur is the most suitable point of junction for the two lines.

5. For purposes of comparison between the two lines reconnoitred by Mr. Nordmann, Raipur may, however, be conveniently accepted for the present as the terminus of the proposed Vizagapatam line, and the leading features of the two routes may be briefly stated as follows.

The eastern route crosses a summit level of 1,346 feet; it is 372 miles in length, with a ruling gradient of 1 in 100, or less.

The western route crosses a summit level of 3,250 feet; it is either 356 miles in length with ruling gradient of 1 in 50; or 343 miles in length, with ruling gradient of 1 in 35.

6. The comparative cost of constructing a metre-gauge railway along the

SUPPLEMENT TO THE GAZETTE OF INDIA, NOVEMBER 18, 1882. 1655

two routes has been roughly estimated by Mr. Nordmann as follows:—

*Eastern Route.*

	£
372 miles at £5,000	1,860,000
Add for some heavy work near Ombadola, 5 miles, at £2,000	10,000
Add for bridges	30,000
	<hr/>
TOTAL	1,900,000

The item of bridging is heavier on this line than on the other.

*Western Route.*

	£
Raipur to foot of upper plateau at Ranigar, 204 miles, at £5,000	1,020,000
Ghât from Ranigar to Limka Saddle, 14 miles, at £8,000	112,000
Limka Saddle to Merialpad Saddle along the upper plateau, 33 miles, at £6,000	198,000
Ghât from Merialpad Saddle to foot in the plain (4 miles northwest of Salar) by the longest route (b), 32 miles, at £10,000.	320,000
Foot to Salar and Vizagapatam, 73 miles, at £5,000	365,000
	<hr/>
TOTAL	2,015,000

*Or*

Raipur to foot of upper plateau at Ranigar, 204 miles, at £5,000	1,020,000
Ghât from Ranigar to Limka Saddle, 14 miles, at £8,000	112,000
Limka Saddle to Merialpad Saddle along the upper plateau, 33 miles, at £6,000	198,000
Ghât from Merialpad Saddle to foot by shortest route (e), 19 miles, at £10,000	190,000
Add for tunnel and viaduct	50,000
Foot of hills to Vizagapatam as before, 73 miles, at £5,000	365,000
	<hr/>
TOTAL	1,935,000

These figures show a slight difference in favour of the eastern route; but, looking to the uncertainty which must attend the execution of the heavy ghât and tunnel works on the western line, in a locality which has acquired an unenviable reputation for malaria, it is not improbable that the difference in cost between the two routes will be considerably more.

7. With respect to the nature of the country traversed by the two routes there does not seem to be much difference. The construction of a railway along either route will serve to open out a vast tract of new and undeveloped country, apparently abounding in natural resources of all kinds.

8. From an engineering point of view, there can be no room for doubt in giving an opinion between the alternative routes; and the same may be as decidedly asserted from the point of view of railway traffic. This is conclusively shown by the figures in Mr. Nordmann's map, giving the heights above sea level of the various points reached, as fixed by aneroidal observations.

The western route encounters the line of ghâts at a part where the lowest practicable saddle is 3,250 feet above sea level. In order to reach that saddle, it makes an abrupt rise of 2,680 feet within 23 or 35 miles, according to the line selected; while within the next 30 miles it falls 1,250 feet. If a railway were taken over the hills by the western route, every ton of goods carried between the Central Provinces and the coast would have to be carried up and down some 2,500 feet unnecessarily, besides being debited with the haulage charges on the steep gradients of the ghât. It must also be borne in view that the heavy ghât work lies within a tract which is notoriously unhealthy; and that the unhealthiness will affect not only the construction of a railway, but also its subsequent working.

The eastern route passes through the line of ghâts at a singularly favourable saddle near Ombadola, and the highest point which it touches is 1,346 feet above sea level. The only part which approaches the nature of a ghât lies

to the north of the Ombadola watershed, where Mr. Nordmann states that a gradient of 1 in 100 may be necessary for about 4 or 5 miles.

9. The facts and figures collected by Mr. Nordmann during his reconnaissance seem to prove that the main line of the proposed railway should be carried from the sea-board northward, through the Ombadola gap, as far at least as Assurgor. Whether from Assurgor the line should follow the route reconnoitred by Mr. Nordmann, in a north-westerly direction, to Raipur, or should trend to the north-east, passing near Sonepur and Sambalpur, to join the proposed line between Sitarampur and Belaspur, will probably depend upon the decision arrived at by the Government of India respecting the route to be followed by that line. It appears far from improbable that there is room for both lines in the vast tract of country to be served. If it be considered essential that the Jeypur plateau be tapped, a branch could without difficulty be led off from Ryaguddah towards Narangpur, which would avoid the chief difficulties of the western route over the hills. From Narangpur the branch could be extended in any direction that may seem desirable. Other branches from the eastern main line could also be made without difficulty.

J. SHAW-STEWART, Col., R.E.,

*The 11th September 1882.*

*Consulting Engineer for Railways.*

Letter from the Government of India, dated 12th August 1882, No. 692 R.C.

No. 2366 W., dated 13th September 1882.

Order thereon by the Government of Madras, P. W. Dept.

ORDERED, that the following letter be addressed to the Government of India:—

(No. 2367 W., dated 13th September 1882—see page 1652.)

No. 2682 W., dated 16th October 1882.

From—Colonel J. SHAW-STEWART, R.E., Offg. Secretary to the Government of Madras, Public Works Dept.,  
To—The Secretary to the Government of India, Public Works Dept.

In continuation of my letter No. 2367 W., dated 13th ultimo, submitting a report with map and sections showing the result of the reconnaissance lately made for a railway between the littoral of Vizagapatam and Raipur in the Central Provinces, I am desired now to state briefly the conclusions at which this Government has arrived after a careful consideration of the information which has been received.

2. As regards the location of the line, His Excellency the Governor in Council sees no reason to dispute the accuracy of the deductions recorded by the Consulting Engineer for Railways in his note of the 11th September as to the general preferability of the eastern route, *via* Ombadola, to the western one passing over the Jeypur highland, and west of the Noagarh hills. Not only would serious engineering difficulties have to be overcome in ascending by the latter to the Merialpad Saddle, 3,250 feet above mean sea level, but it is clear from the work now under execution in the new Potinghy Ghât that fever of a very deadly character has to be encountered, and must, in the opinion of this Government, constitute a very grave objection to this route, both in reference to first construction and to the subsequent working of the line.

3. As a set-off against these objections there is nothing in the character of the country traversed, in the natural productions seeking an outlet, or in any such decided shortcoming of the eastern line as to present preponderating advantages. The reverse is in fact the case, as the uplands of Jeypur which have to be crossed before descending into the country to the westward are more sparsely populated and have a poorer soil than probably any similar portion in either of the routes in question. For these and other reasons His Excellency the Governor in Council has no hesitation in pronouncing in favour of the eastern route, so far at least as relates to the portion extending from Parvatipur, *via* Raigudda and Ombadola, to Assurgor.

4. Northward of the last named point the country presents no further difficulties than those inseparable from the crossing of several streams, and particularly the river Mahanadi, and as the question of extension in this direction must in the main depend on considerations connected with the location of the projected line which is to traverse the country between Sitarampur (with regard to which the Government of India are necessarily in possession of the best information), this Government does not consider it necessary to record any decided opinion.

5. In the event, however, of the Government of India deciding that eventually a bifurcation of the main line is to take place at Assurgor, one branch leading north-west towards Raipur, and the other through Sampur and Sambulpur to the north-east, the former should, I am to say, be first constructed, as it would tap a better grain country and would thus more directly meet the immediate objects of a protective work.

6. As regards the traffic which may be expected, there is abundant proof in Mr. Nordmann's report and in all the evidence which has reached this Government that already, notwithstanding the absence of anything like a made-road, there is an immense amount of produce, carried now wholly on pack-bullocks, seeking an outlet in both directions, and which may on reasonable facilities being afforded readily increase tenfold.

7. Any amount of the best land in Kalahundy and elsewhere is to all appearances only awaiting emigrants and the plough to yield an enormous produce, and the cheap conveyance of salt from the coast must prove an incalculable gain to all that part of India. In famine, moreover, as has been pointed out in previous communications, the provision of a railway leading direct from the grain-producing country of Chhattisgurh to the coast cannot fail to save life and counteract the suffering on the recurrence of famine, similar to that to which the inhabitants of Vizagapatam were exposed in 1865-66.

8. For administrative purposes it may suffice to note that the whole strip of country, constituting the Vizagapatam and Ganjam Districts, is from the absence of trunk roads to the westward, and the presence of a dangerous surf during the monsoon, frequently entirely cut off from communication with the rest of India, and that any means, such as the railway now proposed, must of necessity prove of the utmost utility to Government. The disturbances which not long since occurred in the hill tracts to the south and west, and more lately in Kalahundy, and the difficulties found in dealing promptly with these owing to the total absence of communications, add to the force of these remarks.

9. Notwithstanding, however, the very favourable general projects of returns from the line now proposed, there are no present means of so formulating these as to prove what may be the actual present amount of traffic, still less what this under altered circumstances may be expected to expand to; His Excellency the Governor in Council therefore prefers to base proposals for the line, for the early construction of which both the late and present Maharajahs of Vizianagram and all the neighbouring zemindars have expressed the greatest desire, on its claims as an invaluable protective work for the inhabitants of the coast districts.

10. Were the scheme to prove itself barren of any other results than those of saving life during famine, and of improving the communications for administrative purposes, His Excellency in Council would have no hesitation in according the scheme his warmest support; but as to this must be added the many certain but necessarily at present undefined advantages which must follow on the opening of this important artery of trade, he looks forward with assurance to the early sanction of the scheme by the Government of India. Were an energetic staff at once appointed, the whole work of locating, surveying, and estimating for the line might be carried to completion in the approaching cold season.

11. In conclusion, I am desired to draw attention to one point which has for various reasons neither formed portion of Mr. Nordmann's reconnaissance, nor of the Consulting Engineer's note. I allude to the terminus of the proposed railway on the coast.

12. As well known, there are no engineering difficulties in the country traversed anywhere between Parvatipur and any place which may be selected

as a terminus on the coast, whether that be Calingapatam to the north or Bimlipatam or Vizagapatam to the south.

13. Looking generally to the demands of trade alone, there would not appear to be very much to choose between the two first named ports, at both of which there are European firms commanding large means and a thriving and increasing trade, but taking into account the fact that Vizianagram is the capital of this part of the coast, that the Maharajah has all along taken a most lively and intelligent interest in the scheme, and that Waltair to the south (close to Vizagapatam) is the divisional head-quarters, His Excellency in Council is disposed to recognise the superior claims which this direction for the main line possesses over any other.

14. As already indicated (see G. O., No. 1718 W., dated 8th July 1882), none of the three ports mentioned apparently hold out any such facilities for the construction of large harbours as would lead to the conclusions that works of this character will be undertaken, and this circumstance taken with the general considerations attaching to Vizagapatam as being practically the headquarters of the division, gives this place in His Excellency's opinion paramount claims to be made the terminus of the line on the coast. As Bimlipatam has the largest, and Calingapatam the next largest trade, it can scarcely be matter of doubt that once the main line has been constructed, branch lines (probably with local capital) will be constructed to both places.

15. Should His Excellency's views, as above indicated, meet with acceptance, the trunk line would proceed from Vizagapatam to Vizianagram, Parvatipur, Raigudda, and Ombadola to Assurgor, and thence, at the option of the Government of India, either bifurcate to Raipur or Sambulpur or, if a single line be preferred, hold a directly northern course so as to join the main east and west line at the most convenient point.

*Extract from a letter No. 943 R.-C., dated the 7th October 1882, from the Secretary to the Government of India, Public Works Department, to the Secretary to the Government of Madras, Public Works Department.*

In acknowledging receipt of your letter No. 2682W., of the 16th October, and with reference to the telegrams sent to you regarding surveys for the Kurnool and Nellore lines, I am directed to say that the Government of India is most anxious that the location survey of the Vizagapatam-Raipur line, and the preliminary surveys of the other two lines should be at once undertaken.

I am to say that the Government of India fully concurs with the Government of Madras in the expediency of selecting the eastern route reconnoitred by Mr. Nordmann, as the route by which the railway should be taken, and I am to ask that the project may be sent forward in sections as ready, in order that the sanction of the Secretary of State may be obtained to the commencement of construction.

The Government of India accepts the conclusion of the Government of Madras in favour of Vizagapatam as the sea terminus of the line, and I am to suggest that the project for the section from Vizagapatam to Parvatipuram might be first completed and sent on for sanction.

In conclusion, I am to request that an expression of the high satisfaction of the Government of India may be communicated to Mr. Nordmann and his Assistant Mr. Cormack for the very careful and complete way in which the duties entrusted to them have been carried out.

#### INDEX TO CORRESPONDENCE.

- 1.—Introduction to the Reports.
- 2.—Letter from Mr. Nordmann, No. 14R., dated 16th November 1881.
- 3.—Letter from Chief Commissioner, Central Provinces, in the Public Works Department, No. 9059, dated 16th November 1881.
- 4.—Letter from Colonel Lucie Smith, Commissioner, Chhattisgarh Division, to the Secretary to the Chief Commissioner, Central Provinces, Public Works Department, No. 6812, dated 10th November 1881, together with statement attached thereto.
- 5.—Letter from Mr. Nordmann, No. 190, dated 26th November 1881.
- 6.—Extract from notes by Mr. Nordmann of Reconnaissance between Bissemkattak, Ombadola and Nowjigar, (17th to 25th November 1881) dated 26th November 1881.
- 7.—Letter from Mr. Nordmann, No. 20B., dated 4th December 1881.
- 8.—Extract from notes by Mr. Nordmann of Reconnaissance, Ombadola to Bogor (26th November to 3rd December 1881), dated 4th December 1881.
- 9.—Mr. Cormac's Report dated 4th December 1881.
- 10.—Letter from Mr. Nordmann, No. 24R., dated 6th January 1882.

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- 11.—Extract from Notes by Mr. Nordmann of Reconnaissance (from 5th to 30th December 1881) Bogor to Raipur, distance 166 miles, dated 6th January 1882.
- 12.—Letter from Mr. Nordmann, No. 27R., dated 14th January 1882.
- 13.—Letter from Mr. Nordmann, No. 38K., dated 25th February 1882.
- 14.—Extract from notes by Mr. Nordmann of Reconnaissance from Raipur to Narangpur *via* Rajim, Bindra Naagarh, Hathgaon and Omorkot, 185 miles 4 furlongs (15th January to 5th February 1882), dated 10th February 1882.
- 15.—Extract from notes by Mr. Nordmann of Reconnaissance from Narangpur to Kurapait *via* Boriguma and the old Madesputi Ghât, 38 miles (13th to 16th February 1882), dated 18th February 1882.
- 16.—Mr. Cormac's Diary of Reconnaissance from Raipur to Omorkot in Jeypur *via* Dhamtari and Kamker (16th to 31st January 1882), distance 150½ miles, dated 1st February 1882.
- 17.—Mr. Cormac's Diary of Reconnaissance from Pupogaon *via* Jeypur to Kurapati (15th and 16th February 1882), distance 24 miles, dated 19th February 1882.
- 18.—Letter from Mr. Cormac, to Mr. Nordmann, No. 1-0, dated 1st February 1882.
- 19.—Report by Colonel Francis on the Road from Raipur to Dhamtari and from Dhamtari towards Raigarh, dated 18th March 1876.
- 20.—Letter from Mr. Nordmann, No. 60W., dated 30th March 1882.
- 21.—Letter from Mr. Nordmann, No. 72W., dated 14th April 1882.
- 22.—Letter from Mr. Nordmann, No. 74W., dated 18th April 1882.
- 23.—Notes by Mr. Nordmann of Reconnaissance of the Eastern Ghâts from Kurapati to Salar (6th to 16th March 1882), dated 18th April 1882.
- 24.—Statement of particulars describing Mr. Nordmann's Route from Parvatipuram.
- 25.—Statement of particulars describing Mr. Nordmann's Route from Raipur (*via* Rajim) Naagarh and Narangpur to Kurapati.
- 26.—Statement of particulars describing Mr. Nordmann's Route from Mastiput across the Jeypur plateau and down the Eastern Ghât to Salar.
- 27.—Statement of particulars describing Mr. Cormac's Route from Comellypettah (*via* Singapore) to Lonjigar.
- 28.—Statement of particulars describing Mr. Cormac's Route from Palkonianah (near Singapore) *via* Mursa Ghât to Bogor.
- 29.—Statement of particulars describing Mr. Cormac's Route from Raipur (*via* Dhamtari) to Omorkot, distance 150½ miles.
- 30.—Statement of particulars describing Mr. Cormac's Route from Pupogaon (*via* Jeypur) to Kurapati.
- 31.—Explanation of vernacular terms used in above correspondence.
- 32.—Letter from the Government of Madras, Public Works Department, No. 2367W., dated 13th September 1882.
- 33.—Note by Consulting Engineer for Railways, Madras, dated 11th September 1882.
- 34.—Letter from Government of Madras, No. 2682W, dated 16th October 1882.
- 35.—Extract from Government of India, Public Works Department, letter No. 943 R.-C., dated 27th October 1882, to Government of Madras.

GOVERNMENT OF INDIA.

PUBLIC WORKS DEPARTMENT.

Irrigation.

IRRIGATION AND RAINFALL IN MADRAS FOR 1881-82.

Proceedings of the Government of Madras, Public Works Department.

READ the following paper:—

Proceedings of the Board of Revenue, dated 18th September 1882, No. 2312.

ABSTRACT—Forwarding to the Chief Engineer for Irrigation a Statement of Irrigation and Rainfall for 1881-82.

No. 100 I.—Endorsement on the above.

Submitted to Government.

OOTACAMUND,

J. O. HASTED, *Colonel, R.E.,*

11th October 1882.

*Actg. Chief Engineer for Irrigation.*

To the Joint Secretary to Government, Public Works Department, Irrigation Branch.

Order dated 17th October 1882, No. 826 I., Public Works.

Ordered that a copy of these Proceedings be forwarded for the information of the Government of India, with reference to their letter No. 50 I., dated 11th February 1882.

(True Extract.)

J. O. HASTED, *Colonel, R.E.,*

*Actg. Joint Secy. to Govt., P.W.D.,*

*Irrigation Branch.*

Endorsement dated 17th October 1882, No. 827 I., Public Works.

Forwarded.

J. O. HASTED, *Colonel, R.E.,*

*Actg. Joint Secy. to Govt., P.W.D.,*

*Irrigation Branch.*

PROCEEDINGS OF THE BOARD OF REVENUE.

READ the following papers:—

From the Collector of Anantapur, dated	4th August 1882, No.	160.
"    "    of North Arcot, "	17th July	"
"    "    of South Arcot, "	3rd	"
"    "    of Bellary, "	30th June	"
"    "    of Chingleput, "	22nd August	"
"    "    of Coimbatore, "	8th July	"
"    "    of Cuddapah "	8th August	"

From the Collector of Ganjam,	dated	6th June 1882,	No.	2111.
"    "    of Godavari,	"	7th August	"	
"    "    of Kistna,	"	12th June	"	1277.
"    "    of Kurnool,	"	10th July	"	291.
"    "    of Madura,	"	8th	"	259.
"    "    of Nellore,	"	5th	"	3319.
"    "    of Salem,	"	30th June	"	1418.
"    "    of Tanjore,	"	12th July	"	3504.
"    "    of Tinnevelly,	"	4th	"	393.
"    "    of Trichinopoly,	"	27th June	"	1909.
"    "    of Vizagapatam,	"	10th August	"	

Resolution dated 18th September 1882, No. 2312.

A statement showing the irrigation and rainfall for 1881-82, compiled from the above returns, will, as usual, be forwarded to the Chief Engineer for Irrigation, with reference to Board's Proceedings, dated 11th May 1874, No. 1092.

2. The following abstract shows the area irrigated from Government sources in 1881-82, as compared with 1880-81:—

	ANICUTS AND OTHER IMPORTANT WORKS.		OTHER WORKS.		TOTAL.		Difference.
	1880-81.	1881-82.	1880-81.	1881-82.	1880-81.	1881-82.	
Government land . . .	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
	1,315,640	1,315,408	2,380,978	2,268,045	3,696,618	3,583,453	- 113,165
Inam land . . .	328,882	327,725	592,738	530,592	921,620	858,317	- 63,303
Zemindari land . . .	122,272	117,532	57,900	45,108	180,172	162,640	- 17,532
<b>TOTAL</b> . . .	<b>*1,766,794</b>	<b>1,760,665</b>	<b>+3,031,616</b>	<b>2,843,745</b>	<b>4,798,410</b>	<b>4,604,410</b>	<b>- 194,000</b>
<b>Difference</b> . . .	...	- 6,129	...	- 187,871	...	- 194,000	...

\* is exclusive    }  
 + is inclusive    } of the irrigated area under the Cauvery Lower Anicut

3. A small decrease, amounting to acres 6,129, appears in the area irrigated under anicuts and other important works, that is, the eight works for which capital and revenue accounts are maintained. Of this decrease, acres 4,740 are returned under Zemindari lands for which accurate accounts are not available. Under other works the irrigated area shows a large falling off, amounting to acres 187,871—acres 112,933 in Government lands, acres 62,146

4. As the Cauvery Lower Anicut is not one of the eight systems of irrigation works, it is not shown separately in the statement, but is included under other works—*vide* paragraph 3 of Board's Proceedings, dated 27th January 1882, No. 281.

Comparative Statement of Irrigation and Rainfall for the Years 1880-81 and 1881-82 in the several Districts.

DISTRICTS.	Total Area in Acres.	Cultivable Area in Acres.	AREA IRRIGATED.						RAINFALL.								
			SOWN FROM APRIL TO NOVEMBER 1881.			SOWN FROM DECEMBER 1881 TO MARCH 1882.			WHOLE YEAR OF 1881-82.			1880-81.			1881-82.		
			Total Area.	In comparison with 1880-81.	Increase, Decrease.	Total Area.	In comparison with 1880-81.	Increase, Decrease.	Total Area.	In comparison with 1880-81.	Increase, Decrease.	Total Area.	In comparison with 1880-81.	Increase, Decrease.	Total Area.	In comparison with 1880-81.	Increase, Decrease.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
Ganjam.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
Government land	528,350	362,295	313,532	138,563	2,98	33,801	4,292	141,556	38,093	26,91	...	...	...	...	...	...	...
Islam land	142,663	133,504	114,605	57,680	1,327	3,998	3,054	61,628	17,727	2,80	...	...	...	...	...	...	...
Zemindari	...	...	...	19,918	...	...	956	19,913	956	4,80	...	...	...	...	...	...	...
<b>Total</b>	671,018	495,789	428,337	216,111	...	32,474	6,986	...	8,302	223,097	...	40,776	-18,28	54,64	39,45	-27,80	
Vizagapatam.	181,081	120,003	137,662	41,776	1,103	10,104	3,242	...	61,880	2,139	...	...	...	...	...	...	...
Government land	42,011	41,385	46,078	17,819	1,587	4,92	4,92	...	18,549	2,069	...	12,1170	...	...	...	...	...
Islam land	...	...	...	...	...	...	818	...	...	...	...	...	...	...	...	...	...
Zemindari	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
<b>Total</b>	223,092	161,401	183,740	59,595	...	10,888	2,906	...	70,429	...	...	7,962	-11,31	48,63	42,09	-13,45	
Godavari.	250,016	1,319	...	8,397	...	6,769	258,413	...	5,450	-2,10	...	...	...	...	...	...	...
GODAVARI ANCOUR (e)	135,934	...	9,473	5,213	...	734	141,147	...	10,207	-7,22	...	...	...	...	...	...	...
Government land	109,082	...	5,347	4,069	...	933	...	118,121	...	4,414	-8,90	...	...	...	...	...	...
Islam land	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Zemindari	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
<b>Total</b>	494,982	...	183,501	17,639	...	6,570	512,681	...	20,971	-3,91	18,95	26,59	+40,32	...	...	...	...
All other works	49,476	17,723	...	1,812	...	728	51,285	16,995	...	33,13	...	...	...	...	...	...	...
Government land	22,368	5,736	12	1,150	...	365	23,515	5,371	...	22,53	...	...	...	...	...	...	...
Islam land	457	...	...	...	...	...	457	...	12	-2,62	...	...	...	...	...	...	...
Zemindari	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
<b>Total</b>	1,865,328	1,339,224	642,912	299,492	19,042	10,209	7,497	309,701	11,545	4,836	...	...	...	...	...	...	...
Government land	448,495	43,713	333,159	15,302	3,737	6,368	1,099	164,665	...	4,426	-3,63	...	...	...	...	...	...
Islam land	...	...	109,489	...	5,359	4,059	933	113,578	...	...	...	...	...	...	...	...	...
Zemindari	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
<b>Total</b>	2,313,823	1,469,937	976,051	567,283	9,946	20,661	...	7,663	587,944	2,283	...	+ 0,39	...	...	...	...	...

\* Figures not available.  
(e) The figures include the lands under this Antent in the Kistna District also.

SUPPLEMENT TO THE GAZETTE OF INDIA, NOVEMBER 18, 1882. 1663

- (b) The figures under this include the lands under this **Asent** in the Godavari District also.

*Comparative Statement of Irrigation and Rainfall for the Years 1880-81 and 1881-82 in the several Districts —continued.*

1664 SUPPLEMENT TO THE GAZETTE OF INDIA, NOVEMBER 18, 1882.

DISTRICTS.	Total Area in Acres.	Cultivable Area in Acres.	AREA IRRIGATED.						RAINFALL.								
			Sown from April to November 1881.			Sown from December 1881 to March 1882.			Whole Year of 1881-82.			In comparison with 1880-81.					
			Total Area.	In comparison with 1880-81.	Increase.	Total Area.	In comparison with 1880-81.	Increase.	Total Area.	In comparison with 1880-81.	Increase.	Total Area.	In comparison with 1880-81.	Increase.			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
<i>Anantapur.</i>																	
Government land	2,674,804	2,088,001	757,491	46,639	...	2,393	24,191	...	8,949	70,760	...	11,982	—15.94	...	...	...	
Inam land	613,504	602,823	310,258	18,674	...	6,387	8,484	...	2,331	27,158	...	8,698	—32.02	...	...	...	
Zemindari	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
<b>Total</b>	<b>3,288,308</b>	<b>2,690,824</b>	<b>1,007,749</b>	<b>65,313</b>	<b>...</b>	<b>8,760</b>	<b>32,605</b>	<b>...</b>	<b>11,280</b>	<b>97,918</b>	<b>...</b>	<b>19,980</b>	<b>—20.40</b>	<b>...</b>	<b>17</b>	<b>...</b>	
<i>Kurnool.</i>																	
Government land	3,458,603	1,569,454	808,688	24,922	502	...	2,056	127	27,278	375	...	711	—1.39	...	...	...	
Inam land	1,038,408	1,038,408	633,636	15,794	...	1,191	1,152	480	...	16,946	...	...	...	—4.16	...	...	...
Zemindari	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
<b>Total</b>	<b>4,497,011</b>	<b>2,607,862</b>	<b>1,532,324</b>	<b>40,716</b>	<b>...</b>	<b>689</b>	<b>3,508</b>	<b>353</b>	<b>...</b>	<b>44,224</b>	<b>...</b>	<b>336</b>	<b>—0.75</b>	<b>22.66</b>	<b>20.17</b>	<b>—10.99</b>	
<i>Chingleput.</i>																	
Government land																	
Chembarambakkam Tank.																	
{ Inam land																	
{ Zemindari																	
<b>Total</b>	<b>14,391</b>	<b>8,463</b>	<b>...</b>	<b>3,518</b>	<b>...</b>	<b>4,397</b>	<b>13,971</b>	<b>1,391</b>	<b>...</b>	<b>13.92</b>	<b>...</b>	<b>52.87</b>	<b>...</b>	<b>...</b>	<b>...</b>	<b>...</b>	
Particulars not known.																	
Government land	234,172	17,715	...	6,328	...	3,518	...	4,397	...	20,636	...	20,638	—6.91	...	...	...	
Inam land	41,191	4,038	...	2,135	...	...	4,038	2,135	...	58,809	...	22,926	—38.98	...	...	...	
Zemindari	3,183	...	...	...	...	...	...	...	...	4,280	211	...	4,93	...	...	...	
<b>Total</b>	<b>234,172</b>	<b>17,715</b>	<b>...</b>	<b>6,328</b>	<b>...</b>	<b>3,518</b>	<b>...</b>	<b>4,397</b>	<b>...</b>	<b>20,636</b>	<b>...</b>	<b>20,638</b>	<b>—6.91</b>	<b>...</b>	<b>...</b>	<b>...</b>	
All other works																	
Government land	742,151	488,917	244,525	24,043	...	68,088	42,760	312,613	...	18,717	—5.98	...	...	...	...	...	
Inam land	264,125	114,667	45,229	3,183	...	24,552	17,618	3,761	...	62,847	...	20,791	—33.08	...	...	...	
Zemindari	...	...	...	...	...	...	...	...	...	4,280	211	...	4,93	...	...	...	
<b>Total</b>	<b>1,579,217</b>	<b>1,006,276</b>	<b>603,584</b>	<b>292,937</b>	<b>...</b>	<b>558</b>	<b>86,808</b>	<b>38,739</b>	<b>379,740</b>	<b>...</b>	<b>39,297</b>	<b>—10.35</b>	<b>47.29</b>	<b>34.14</b>	<b>—27.81</b>		

SUPPLEMENT TO THE GAZETTE OF INDIA, NOVEMBER 18, 1882. 1665

Pālār Ament (c)	North Ament	Government land	30,414	2,207	14,264	9,089	44,678	-15,40
			5,755	145	1,968	594	7,723	+5,81
All other works		Inām land	...	...	...	...	...	...
			...	...	...	...	...	...
TOTAL		Particulars not known	36,169	2,062	16,232	8,495	52,401	...
			132,242	18,450	65,567	20,425	191,809	-1,03
All other works		Zemindari	25,886	...	6,874	16,127	42,023	-12,17
			...	...	...	...	...	...
TOTAL		Government land	2,324,726	1,002,418	20,657	24,514	236,487	-3,74
			228,649	170,186	162,656	18,095	49,746	-9,39
TOTAL		Inām land	...	...	...	...	...	...
			...	...	...	...	...	...
TOTAL		Zemindari	...	...	...	...	...	...
			...	...	...	...	...	...
TOTAL	South Ament	Government land	2,553,375	1,172,604	721,318	191,307	13,638	...
			...	...	...	...	...	...
Falandorai Ament	South Ament	Inām land	2,702	116	339	3	3,041	119
			406	1	148	8	554	9
TOTAL		Zemindari	...	...	...	...	...	...
			...	...	...	...	...	...
TOTAL		Particulars not known	3,108	117	487	11	3,595	128
			250,230	39,245	75,897	13,027	335,127	...
All other works		Government land	24,416	2,760	4,615	37,443	1,755	-4,68
			1,360	35	667	91	2,027	56
TOTAL		Inām land	...	...	...	...	...	...
			...	...	...	...	...	...
TOTAL		Zemindari	...	...	...	...	...	...
			...	...	...	...	...	...
TOTAL	Tanjore	Government land	2,965,512	2,219,709	1,155,878	261,932	39,361	54,923
			160,129	145,689	92,683	24,822	2,761	7,157
TOTAL		Inām land	...	...	...	...	...	...
			...	...	...	...	...	...
TOTAL		Zemindari	...	...	...	...	...	...
			...	...	...	...	...	...
TOTAL		Particulars not known	3,125,641	2,365,398	1,248,561	288,114	42,157	90,078
			...	...	...	...	...	...
Upper Ament (d)	Tanjore	Government land	683,503	22,882	70,774	17,137	754,277	15,725
			97,779	6,725	10,076	1,972	13,379	4,716
TOTAL		Inām land	...	...	...	...	...	...
			...	...	...	...	...	...
TOTAL		Zemindari	...	...	...	...	...	...
			...	...	...	...	...	...
TOTAL		Particulars not known	781,282	29,607	80,860	...	9,166	862,132
			...	...	...	...	...	20,441
All other works		Government land	80,404	1,153,198	981,708	763,907	5,745	1,503
			40,317	...	258,487	138,096	8,697	7,419
TOTAL		Inām land	629,701	465,931	...	...	...	...
			...	...	...	...	...	...
TOTAL		Zemindari	...	...	...	...	...	...
			...	...	...	...	...	...
TOTAL		Particulars not known	2,201,401	1,619,129	1,240,135	902,003	14,442	114,264
			...	...	...	...	...	...
All other works		Government land	...	...	...	...	...	...
			...	...	...	...	...	...
TOTAL		Inām land	...	...	...	...	...	...
			...	...	...	...	...	...
TOTAL		Zemindari	...	...	...	...	...	...
			...	...	...	...	...	...
TOTAL		Particulars not known	1,619,129	1,240,135	902,003	14,442	114,264	18,088
			...	...	...	...	...	1,016,267
All other works		Government land	...	...	...	...	...	...
			...	...	...	...	...	...
TOTAL		Inām land	...	...	...	...	...	...
			...	...	...	...	...	...
TOTAL		Zemindari	...	...	...	...	...	...
			...	...	...	...	...	...
TOTAL		Particulars not known	2,201,401	1,619,129	1,240,135	902,003	14,442	114,264
			...	...	...	...	...	...
All other works		Government land	...	...	...	...	...	...
			...	...	...	...	...	...
TOTAL		Inām land	...	...	...	...	...	...
			...	...	...	...	...	...
TOTAL		Zemindari	...	...	...	...	...	...
			...	...	...	...	...	...
TOTAL		Particulars not known	1,619,129	1,240,135	902,003	14,442	114,264	18,088
			...	...	...	...	...	1,016,267
All other works		Government land	...	...	...	...	...	...
			...	...	...	...	...	...
TOTAL		Inām land	...	...	...	...	...	...
			...	...	...	...	...	...
TOTAL		Zemindari	...	...	...	...	...	...
			...	...	...	...	...	...
TOTAL		Particulars not known	2,201,401	1,619,129	1,240,135	902,003	14,442	114,264
			...	...	...	...	...	...
All other works		Government land	...	...	...	...	...	...
			...	...	...	...	...	...
TOTAL		Inām land	...	...	...	...	...	...
			...	...	...	...	...	...
TOTAL		Zemindari	...	...	...	...	...	...
			...	...	...	...	...	...
TOTAL		Particulars not known	2,201,401	1,619,129	1,240,135	902,003	14,442	114,264
			...	...	...	...	...	...
All other works		Government land	...	...	...	...	...	...
			...	...	...	...	...	...
TOTAL		Inām land	...	...	...	...	...	...
			...	...	...	...	...	...
TOTAL		Zemindari	...	...	...	...	...	...
			...	...	...	...	...	...
TOTAL		Particulars not known	2,201,401	1,619,129	1,240,135	902,003	14,442	114,264
			...	...	...	...	...	...
All other works		Government land	...	...	...	...	...	...
			...	...	...	...	...	...
TOTAL		Inām land	...	...	...	...	...	...
			...	...	...	...	...	...
TOTAL		Zemindari	...	...	...	...	...	...
			...	...	...	...	...	...
TOTAL		Particulars not known	2,201,401	1,619,129	1,240,135	902,003	14,442	114,264
			...	...	...	...	...	...
All other works		Government land	...	...	...	...	...	...
			...	...	...	...	...	...
TOTAL		Inām land	...	...	...	...	...	...
			...	...	...	...	...	...
TOTAL		Zemindari	...	...	...	...	...	...
			...	...	...	...	...	...
TOTAL		Particulars not known	2,201,401	1,619,129	1,240,135	902,003	14,442	114,264
			...	...	...	...	...	...
All other works		Government land	...	...	...	...	...	...
			...	...	...	...	...	...
TOTAL		Inām land	...	...	...	...	...	...
			...	...	...	...	...	...
TOTAL		Zemindari	...	...	...	...	...	...
			...	...	...	...	...	...
TOTAL		Particulars not known	2,201,401	1,619,129	1,240,135	902,003	14,442	114,264
			...	...	...	...	...	...
All other works		Government land	...	...	...	...	...	...
			...	...	...	...	...	...
TOTAL		Inām land	...	...	...	...	...	...
			...	...	...	...	...	...
TOTAL		Zemindari	...	...	...	...	...	...
			...	...	...	...	...	...
TOTAL		Particulars not known	2,201,401	1,619,129	1,240,135	902,003	14,442	114,264
			...	...	...	...	...	...
All other works		Government land	...	...	...	...	...	...
			...	...	...	...	...	...
TOTAL		Inām land	...	...	...	...	...	...
			...	...	...	...	...	...
TOTAL		Zemindari	...	...	...	...	...	...
			...	...	...	...	...	...
TOTAL		Particulars not known	2,201,401	1,619,129	1,240,135	902,003	14,442	114,264
			...	...	...	...	...	...
All other works		Government land	...	...	...	...	...	...
			...	...	...	...	...	...
TOTAL		Inām land	...	...	...	...	...	...
			...	...	...	...	...	...
TOTAL		Zemindari	...	...	...	...	...	...
			...	...	...	...	...	...
TOTAL		Particulars not known	2,201,401	1,619,129	1,240,135	902,003	14,442	114,264
			...	...	...	...	...	...
All other works		Government land	...	...	...	...	...	...
			...	...	...	...	...	...
TOTAL		Inām land	...	...	...	...	...	...

(d) The figure includes the lands under this work in the Chingleput District also.

*Comparative Statement of Irrigation and Rainfall for the years 1880-81 and 1881-82 in the several Districts—(concluded).*

AREA IRRIGATED.												RAINFALL.						
DISTRICTS.	Cultivable Area in Acres.	Cultivated Area in Acres.	SOWN FROM APRIL TO NOVEMBER 1881.			SOWN FROM DECEMBER 1881 TO MARCH 1882.			WHOLE YEAR OF 1881-82.			Percent- age of Increase or Decrease in 1881-82.						
			In comparison with 1880-81.		Total Area.	In comparison with 1880-81.		Total Area.	In comparison with 1880-81.		Total Area.	In-crease.	In-crease.					
			Total Area.	Increase.	Decrease.	Total Area.	In-crease.	Decrease.	Total Area.	In-crease.	Decrease.	In-crease.	In-crease.					
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17		
Trichinopoly.																		
Government land	1,625,003	1,284,521	Acres, 860,900	Acres, 104,071	Acres, 472	Acres, 55,489	Acres, 4739	Acres, 5,789	Acres, 159,560	Acres, 6,271	Acres, 3,93	Acres, 22,030	Acres, 1,145	Acres, 6,271	Acres, 3,93	Acres, 22,030		
Inam land	232,970	189,877	117,114	17,291	482	482	4,739	663	12,299	72	72	1,145	...	72	72	1,145		
Zemindari	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...		
<b>TOTAL</b>	<b>1,869,973</b>	<b>1,474,398</b>	<b>978,014</b>	<b>121,362</b>	<b>10</b>	<b>...</b>	<b>60,228</b>	<b>...</b>	<b>5,136</b>	<b>181,590</b>	<b>...</b>	<b>5,126</b>	<b>...</b>	<b>2,882</b>	<b>41,68</b>	<b>32,90</b>		
Madura.																		
Government land	1,719,355	1,316,034	727,603	103,487	16,006	32,210	18,483	135,697	...	2,477	-1,79	...	...	...	...	...		
Inam land	240,445	222,862	109,891	8,392	1,536	3,907	1,464	12,299	72	...	+0.60	...	...	...	...	...		
Zemindari	...	...	...	16	...	...	...	16	...	...	...	...	...	...	...	...		
<b>TOTAL</b>	<b>1,959,800</b>	<b>1,538,896</b>	<b>837,494</b>	<b>111,895</b>	<b>17,542</b>	<b>...</b>	<b>36,117</b>	<b>...</b>	<b>19,947</b>	<b>148,012</b>	<b>...</b>	<b>2,105</b>	<b>-1,59</b>	<b>35,90</b>	<b>25,85</b>	<b>-27,99</b>		
Tinsley.																		
Sriakuntan Anicut.	Government land		Particulars not known.	6,721			4,434			17,407			24,126			2,898		
	Inam land			280			43			803			1,083			-11,35		
	Zemindari			...			391			599			599			+5,72		
<b>TOTAL</b>	Government land			<b>7,001</b>	<b>...</b>	<b>...</b>	<b>4,868</b>	<b>...</b>	<b>18,809</b>	<b>1,715</b>	<b>...</b>	<b>25,810</b>	<b>...</b>	<b>3,153</b>	<b>-12,22</b>	<b>...</b>	<b>...</b>	
All other works.	Inam land		Particulars not known.	64,854			11,170			165,231			230,085			6,390		
	Zemindari			4,953			530			13,360			6,44			-277		
	Zemindari			3,937			1,733			13,660			3,72			+3,57		
<b>TOTAL</b>	Government land			<b>1,105,361</b>	<b>71,575</b>	<b>...</b>	<b>15,604</b>	<b>182,638</b>	<b>6,376</b>	<b>...</b>	<b>254,213</b>	<b>...</b>	<b>9,228</b>	<b>-3,63</b>	<b>...</b>	<b>...</b>		
All other works.	Inam land		Particulars not known.	5,233			573			14,163			19,396			+0.90		
	Zemindari			3,937			2,124			14,259			2,386			+1.44		
	Zemindari			...			...			18,196			262			...		
<b>TOTAL</b>	Government land			<b>1,281,610</b>	<b>80,745</b>	<b>...</b>	<b>18,301</b>	<b>211,060</b>	<b>9,511</b>	<b>...</b>	<b>291,805</b>	<b>...</b>	<b>8,790</b>	<b>-3,01</b>	<b>33,55</b>	<b>23,01</b>		
All other works.	Inam land			...			...			...			...			...		
<b>TOTAL</b>	Inam land			<b>2,168,435</b>	<b>1,768,540</b>	<b>...</b>	<b>18,301</b>	<b>211,060</b>	<b>9,511</b>	<b>...</b>	<b>291,805</b>	<b>...</b>	<b>8,790</b>	<b>-3,01</b>	<b>33,55</b>	<b>23,01</b>		

SUPPLEMENT TO THE GAZETTE OF INDIA, NOVEMBER 18, 1882. 1667

<i>Coimbatore.</i>															
Government land		3,760,771	2,677,805	1,885,342	72,079	***	4,772	20,604	5,089	***	92,683	317	***	0.34	
Islam land		324,511	308,849	215,051	8,716	427	2	2,621	702	***	11,337	1,129	***	+11.06	
Zemindari		...	...	136	...	...	...	...	...	136	...	2	-1.45	...	
TOTAL		4,085,282	2,986,654	2,100,393	80,381	***	4,847	23,225	5,791	...	104,156	1,444	...	+1.41	
<i>Salem.</i>															
Government land		3,654,532	1,710,532	1,019,288	76,418	6,532	...	20,589	...	13,934	97,007	***	7,392	-7.62	
Islam land		260,532	152,671	92,315	7,940	3,760	...	974	233	745	8,914	682	...	-50.53	
Zemindari		...	...	...	449	...	...	...	...	...	...	...	...	...	
TOTAL		3,915,064	1,863,213	1,111,603	84,807	2,782	...	21,796	...	14,679	106,603	...	11,807	-11.16	
<i>TOTAL ANICUT</i>															
{ Government land		1,187,242	27,420	...	128,166	...	27,652	1,315,408	...	232	-0.92	...	...	...	
{ Islam land		300,939	611	...	26,766	...	1,768	327,725	...	1,157	-0.35	...	...	...	
{ Zemindari		112,883	...	5,677	4,699	937	...	117,532	...	4,740	-4.03	...	...	...	
TOTAL		1,601,034	22,954	...	139,631	...	28,483	1,760,665	...	6,129	-0.35	...	...	...	
Particulars not known.															
<i>TOTAL OF OTHER WORKS</i>															
{ Government land		1,635,745	46,056	...	632,300	...	158,989	2,268,045	...	112,933	-4.98	...	...	...	
{ Islam land		399,257	...	19,597	131,335	...	42,549	530,592	...	63,146	-11.71	...	...	...	
{ Zemindari		29,451	...	13,419	15,657	627	...	46,108	...	12,792	-28.35	...	...	...	
TOTAL		...	...	2,064,453	13,040	...	779,292	...	200,911	2,843,745	...	187,871	-6.61	...	
<i>GRAND TOTAL, INCLUDING ANICUTS AND OTHER WORKS.</i>															
{ Government land		42,926,451	26,893,654	15,067,601	2,822,987	73,476	...	760,466	...	186,641	3,583,453	...	113,165	-3.16	
{ Islam land		7,860,961	7,174,118	4,033,183	700,216	142,284	...	18,986	158,101	44,317	858,317	162,640	...	63,303	...
{ Zemindari		...	...	...	19,096	20,356	1,564	...	...	...	17,532	-10.78	...	...	...
TOTAL		*50,787,412	*34,067,772	19,100,784	3,665,487	35,394	...	938,923	...	229,894	4,604,410	...	104,000	-4.21	
													Average.		
													37.85	29.31	
														-22.56	

\* These figures do not correspond with those given in the similar statement for last year, as corrections in these areas have since been made in some districts.  
2. Areas twice cropped is entered twice over in Column 8. This accounts for the extent entered in that column being in some cases higher than the figures in Column 8.

E. GIBSON,  
Acting Secretary.

GOVERNMENT OF INDIA.  
PUBLIC WORKS DEPARTMENT.  
[TELEGRAPH.]

ABSTRACT OF FOREIGN TRAFFIC FOR THE MONTH OF JULY 1882.

CLASS OF MESSAGES.	ROUTE.																		No. Indian Value.							
	WEST.						EAST.																			
	VIA TEHRAN.		VIA TURKEY.		PERSIAN GULF.		VIA SUEZ.		VIA AMUR.		VIA MADRAS.		VIA RANGOON.		NATIVE BURMA.		VIA PAUMBEN.									
	No.	Indian Value.	No.	Indian Value.	No.	Indian Value.	No.	Indian Value.	No.	Indian Value.	No.	Indian Value.	No.	Indian Value.	No.	Indian Value.	No.	Indian Value.								
INDIAN.																										
Sent . . . . .	5,226	R a.	19,792	b	104	R a.	340	0	29	118	15	1,302	6,740	9	37	90	9	R a.	R a.							
Received . . . . .	4,132	20,610	3	274	873	10	34	168	1	1,285	5,225	8	22	65	13	82	2,598	15	335	16						
TOTAL . . . . .	9,358	40,302	8	378	1,213	10	63	287	0	2,587	11,966	1	59	156	6	1,665	3,974	3	373	1,458						
TRANSIT.																			R a.							
From East to West—																			1,591							
From West to East—																			3,072							
Received . . . . .	Via Madras . . . . .	2,976	12,114	7	8	39	6	6	12	12	1,298	5,206	10	...	...	...	...	...	4,288							
	" Rangoon . . . . .	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	17,373							
	" Laingha . . . . .	290	851	1	1	1	12	1	27	2	155	538	6	...	...	...	...	...	...							
	" Paumben . . . . .	264	1,068	12	9	24	14	...	...	...	96	351	3	1	8	10	...	...	447							
Sent . . . . .	Via Madras . . . . .	2,945	12,245	12	191	684	0	8	30	6	885	3,249	14	18	49	14	...	...	4,017							
	" Rangoon . . . . .	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	16,259							
	" Laingha . . . . .	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	14							
	" Paumben . . . . .	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	370							
From West to East—	Via Bombay and Karachi.	1,068	4,131	7	5	41	7	4	33	6	...	...	...	...	...	...	...	...	1,067							
	Via Karachi and Bombay.	662	2,926	10	20	59	4	3	16	14	...	...	...	...	...	...	...	...	4,206							
From East to East—	Via Paumben . . . . .	...	...	...	...	...	...	...	...	...	...	...	...	41	179	15	1	5	42							
	" Madras . . . . .	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	185								
	" Rangoon . . . . .	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	5								
TOTAL . . . . .	8,225	33,278	1	234	850	11	22	120	8	2,404	9,346	1	19	58	8	41	179	15	1	4	6	34	113	2	10,981	43,956
	GRAND TOTAL . . . . .																		28,922	1,10,545						

ABSTRACT OF FOREIGN TRAFFIC WITH INDIA BY THE INDO-EUROPEAN AND RED SEA ROUTES FOR THE MONTH OF JULY 1882.

Comparative Statement of the Nett Indian Sea and Land Customs Revenue (excluding Salt Revenue) for the first seven months of the official year 1882-83, and of the eleven preceding years.  
(In thousands of Rupees.)

YEAR.	BOMBAY.				SINDH.				MADRAS.				BRITISH BURMA.				TOTAL BRITISH INDIA.										
	On Imports of Liquors.	On other Imports.	On Exports.	Total Revenue.	On Imports of Liquors.	On other Imports.	On Exports.	Total Revenue.	On Imports of Liquors.	On other Imports.	On Exports.	Total Revenue.	On Imports of Liquors.	On other Imports.	On Exports.	Total Revenue.	On Imports of Liquors.	On other Imports.	On Exports.	Total Revenue.							
1871-72	5,80	41,51	11,68	58,99	4,21	23,72	2,19	30,12	73	71	97	2,41	2,01	7,31	8,29	17,61	90	2,59	10,72	14,01	13,65	75,64	89,29	33,85	1,23,14	1871-72.	
1872-73	7,16	42,07	12,77	62,00	3,19	23,87	1,80	28,86	65	65	1,29	2,59	2,26	6,86	6,55	15,67	1,82	2,71	19,53	24,06	15,08	76,16	91,24	41,94	1,33,18	1872-73.	
1873-74	5,84	40,14	9,35	55,33	3,46	23,11	1,78	28,35	71	46	66	1,83	2,07	7,87	8,06	18,00	1,95	2,78	15,46	20,19	14,03	74,36	88,39	35,31	1,23,70	1873-74.	
1874-75	6,68	45,52	6,83	60,03	3,88	26,13	1,94	31,95	66	38	76	1,80	2,01	7,95	7,83	17,79	2,28	3,75	10,24	16,27	15,51	83,73	99,24	27,60	1,26,84	1874-75.	
1875-76	6,92	43,56	8,11	58,59	3,90	22,60	3,45	29,95	73	54	92	2,19	2,37	8,33	7,68	18,38	2,18	2,78	18,51	23,47	16,10	77,81	93,91	38,67	1,32,58	1875-76.	
1876-77	7,23	37,99	7,41	52,63	4,57	22,10	58	27,25	90	42	13	1,45	3,20	7,42	5,02	15,64	2,59	3,04	13,00	18,63	18,49	70,97	89,46	26,14	1,15,60	1876-77.	
1877-78	8,46	47,56	8,64	64,66	4,89	25,79	52	31,20	1,19	49	22	1,90	3,07	4,63	1,14	8,84	2,81	3,33	9,65	15,79	20,42	81,80	1,02,22	20,17	1,22,39	1877-78.	
1878-79	7,45	38,84	7,75	54,04	4,78	23,32	1,25	29,35	1,03	32	11	1,46	3,29	5,48	2,50	11,27	4,02	3,95	14,44	22,41	20,57	71,91	92,48	26,05	1,18,53	1878-79.	
1879-80	6,68	35,70	5,23	47,61	5,19	19,68	1,02	25,89	1,79	45	11	2,35	3,11	5,34	3,70	12,15	3,96	3,60	17,39	24,95	20,73	64,77	85,50	27,45	1,12,95	1879-80.	
1880-81	7,52	34,66	6,51	48,69	4,89	28,25	1,03	34,17	2,60	64	13	3,37	2,82	6,14	5,21	14,17	2,68	4,53	19,36	26,57	20,51	74,22	94,73	32,24	1,26,97	1880-81.	
1881-82	7,50	32,69	8,80	48,99	5,89	25,50	85	32,24	2,24	71	17	3,12	2,78	5,69	3,38	11,85	3,93	4,42	22,92	31,27	22,34	69,01	91,35	36,12	1,27,47	1881-82.	
1882-83	7,94	10	8,84	16,88	5,74	-96*	75	5,53	2,03	4	31	2,38	3,18	1	2,41	5,60	4,65	6	28,40	38,11	23,54	-75*	22,79	40,71	63,50	1,28,53.	

\* The amount refunded is greater than the duty collected.

DEPARTMENT OF FINANCE AND COMMERCE,  
STATISTICAL BRANCH;  
Calcutta, 16th November 1882.

D. M. BARBOUR,

Secretary to the Government of India.

GOVERNMENT OF INDIA.  
DEPARTMENT OF FINANCE AND COMMERCE.

THEORY OF FINANCE AND COMMERCE.

1509 EDITION CURRENT OF FOOD-GRAINS FOR THE 1ST HALF OF OCTOBER 1882, PUBLISHED IN PAGES 1504, 1505, 1508 AND 1509 OF THE SUPPLEMENT TO THE "GAZETTE OF INDIA," DATED 11th NOVEMBER 1882.

DEPARTMENT OF FINANCE AND COMMERCE,  
(Statistical Branch.)

\* The figures (17) given in the last year's return were wrong, and should have been 10.

D. M. BARBOUR,  
*Secretary to the Government of India.*

Statistical Branch.)

GOVERNMENT OF INDIA.

REVENUE AND AGRICULTURAL DEPARTMENT.

REPORTS ON THE STATE OF THE SEASON AND PROSPECTS OF THE CROPS FOR THE WEEK ENDING THE 14th NOVEMBER 1882.

Presidency or Province and District.	Rainfall for week preceding.	State of agricultural prospects.
<b>Madras— (Nov. 15th)</b>		
Bellary . . . .	·82 (average of four stations).	Standing crops generally good; harvest paddy and dry grains, yield average.
Kurnool . . . .	·41 (average of three stations).	More rain wanted for dry crops, wet crops withering in five talukas; harvest early dry crops, outturn generally below average; cattle disease in parts.
Ganjam . . . .	·80 (average of nine stations).	More rain wanted for standing crops; dry grains and sugarcane thriving; harvest paddy, outturn average; fever, small-pox and cattle disease continue.
Kistna . . . .	1·08 (average of eleven stations).	Standing crops paddy affected by grub in three talukas; harvest dry grains and tobacco, yield below average; fever and cattle disease prevail; water over anicut 2·34 feet.
Chingleput (Madras) . . . .	1·45 (average of eleven stations).	Standing crops good under river channels, larger tanks and wells, elsewhere withering from want of rain; harvest paddy and dry grains, yield below average; fever, small-pox and cattle disease in parts.
Coimbatore . . . .	2·85 (average of sixteen stations).	Standing crops good; harvest wet and dry grains, yield average; fever, small-pox, cholera and cattle disease in parts.
Tanjore . . . .	1·62 (average of thirteen stations).	Standing crops good except in parts upland; harvest wet and dry grains, outturn below average.
Madura . . . .	1·94 (average of ten stations).	Standing crops fair except in two talukas; cholera in parts.
Malabar . . . .	1·76 (average of thirteen stations).	Second crop progressing; small-pox and fever slight in parts.
Travancore . . . .	2·47	Agricultural operations progressing; fever continues. <i>General Remarks.</i> —General prospects good.
<b>Bombay—(Nov. 15th)</b>		
Kurrachee . . . .		River at Kotri on 13th, 6 feet 7 inches against 6½ feet on same date last year; fever and colds in all talukas; two cases of small-pox in Sujawal taluka; cattle disease in Sakra; wheat, red rice and bajri in Badu 34, 40 and 56, in Mirpur Batoro 22, 48 and 56, in Tatta 24, 32 and 46, and in Kotri 30 and 50 lbs. per rupee respectively.
Hyderabad . . . .		<i>Kharif</i> crops are being thrashed; <i>rabi</i> sowing still continues; days unusually hot, north winds not set in; small-pox in Hyderabad; cattle-disease in Badin and fever in twelve talukas; wheat 25, bajri 44, jowari 50, rice red 32 and rice white 22 lbs. per rupee.
Ahmedabad . . . .		Sowing of wheat and gram continues, other crops doing well; fever in Dholka, Veramgaun, Gogo and Parentij; cattle-disease continues in Sanand; wheat 28 and bajri 33 lbs. per rupee.
Baroda . . . .		<i>Kharif</i> harvesting and <i>rabi</i> sowing continue; slight cholera in Amreli and Dehgam; bajri 33 and rice common 24½ lbs. per rupee.
Surat . . . .		<i>Rabi</i> sowing progressing; standing crops healthy; jowari 39, and nagli 59 lbs. per rupee.
Nasik . . . .		Locusta gone save in Peint and Ghāt tracts; <i>rabi</i> prospects good on the whole; distress reported in Chandore; bajri harvested; wheat 25, jowari 44, bajri 36, and rice 26 lbs. per rupee.
Colaba (Bombay) . . . .		Abnormal temperature nil on 8th and 14th; 1° cool on 9th and 11th, 2° cool on 10th and 12th, and 3° cool on 13th; vapour in air normal except on 14th when it was in defect of normal; wind normal.
Poona . . . .		<i>Rabi</i> sowing completed; locusts disappearing; bajri 46, and jowari 57 lbs. per rupee, in Poona bajri 39 and jowari 52 lbs. per rupee.
Ahmednagar . . . .		Rain urgently wanted; <i>rabi</i> crops withering; reaping of bajri completed; locusts almost disappeared; bajri, maximum 66 lbs. per rupee in Jamkhed, minimum 42 lbs. in Akola; jowari, maximum 96 lbs. per rupee in Jamkhed, minimum 48 lbs. in Akola.
Sholapore . . . .		Rain badly wanted; bajri 59 lbs. 16 tolas, and jowari 80 lbs. 17 tolas per rupee.
Dharwar . . . .	Slight rain in Gadag, Hangal and Karajgi.	Harvesting of early crops in progress; sowing of late crops finished in three talukas and progressing in others; three cholera cases in a village of Ron taluka; slight cattle disease in two talukas; rice, minimum 20, and jowari 52 lbs. per rupee.
Kanara . . . .		Rice harvest continues in all talukas except Karwar where second crop preparations commenced; <i>ragi</i> harvest in Sirsi and Sidapur; small-pox subsiding in Sidapur; fever in two talukas; common rice at Karwar 11 seers, in district, average 13½ seers per rupee.

Presidency or Province and District.	Rainfall for week preceding.	State of agricultural prospects.
<b>Bombay—contd.</b> Rajkot . . .		Weather cold; general health fair; cholera slight in Junagad, Navanagar and Rajkot talukas, disappeared from Dhrol and Gondal; fever in Navanagar, Dhrol, Gondal, Mengui, Lodhika and Bagasra; <i>bajri</i> 30 and <i>jowari</i> 33 lbs. per rupee. <i>General Remarks.</i> —Harvesting <i>kharif</i> and sowing <i>rabi</i> complete in some districts, in progress in the rest; rain urgently wanted <i>rabi</i> in Ahmednagar and Sholapur, also in Satara; locusts in parts Nasik and Satara; fever and cattle disease in some districts; slight cholera and small-pox in a few.
<b>Bengal—</b> Chittagong . . .	1-17	Weather variable, beginning to get cold; prospects of crops good; cattle disease prevails; fever and small-pox reported from Cox's Bazar; prices stationary.
Dacca 24-Pergunnahs (Alipore)	<i>Nil</i> <i>Nil</i>	Winter crops being put in; rice promising well. Prospects of late rice and sugarcane continue satisfactory; sowings of winter crops going on; price of common rice stationary; public health generally good, though isolated cases of cholera and fever reported from Baraset and Diamond Harbour Sub divisions.
Moorschabad . . .	29	<i>Amun</i> crops promising; other crops doing well; <i>rabi</i> being sown; fever prevails here and there.
Rajshahye . . .	<i>Nil</i>	Prospects generally favourable; cholera in parts of district; fever prevalent.
Burdwan . . .	<i>Nil</i>	Prospects of winter crops fairly good; sugarcane doing well; a considerable amount of fever in the district.
Rungpore . . .	<i>Nil</i>	Weather seasonable; prospects of crops good; cultivation of lands for tobacco, mustard, and potatoes going on; public health good.
Bhagalpur . . .	<i>Nil</i>	<i>Rabi</i> sowings in progress; cutting of <i>aghani dhan</i> begun; prospects of crops good; fever prevalent in Muddehpura and Soopole Sub-divisions.
Purneah . . .	<i>Nil</i>	Prospects of crops fair; winter crops being sown; public health bad; fever very prevalent.
Patna . . .	<i>Nil</i>	<i>Rabi</i> sowings continue; wheat, barley, and gram have germinated; <i>rahari</i> , cotton, and castor promise well; <i>bhadoi</i> harvest all over; public health good.
Durbhunga Hazaribagh . . .	<i>Nil</i> <i>Nil</i>	Prospects of crops fair; public health fair; prices stationary. Weather bright and cool; prospects of rice favourable; <i>rabi</i> sowings continue; general health good.
Cuttack . . .	9	<i>Sarad</i> rice ripening; no more rain wanted; prospects of crops excellent; public health good. <i>General Remarks.</i> —Some rain fell in Chittagong, and a slight shower in Moorschabad and Cuttack, none in the other reporting districts; prospects of late rice not very satisfactory in several places owing to want of early rains, but the crop on the whole is expected to be a fair one; sugarcane crops generally promising; prospects of winter crops generally reported to be favourable. In Chittagong Hill Tracts cotton crop is said to have suffered materially from the heavy rain of the preceding week; fever reported from almost all the districts of the Burdwan and Presidency Divisions and from a few other districts, but it is said to be bad in Purneah; there is still cholera in some places; small-pox reported from one or two places; public health otherwise good.
<b>N.-W. Provinces and Oudh—</b>		
Benares (Nov. 14th)	<i>Nil</i>	Weather seasonable; <i>rabi</i> sowings almost completed; rice crop good; no sickness amongst men or cattle; prices steady.
Allahabad ( „ 15th)	<i>Nil</i>	Prices falling; health very good; young crops doing well; <i>juar</i> and <i>bajra</i> nearly harvested; prospects very good.
Gorakhpur ( „ 13th) Jhansi ( „ „ )	· ·	Weather fine; crops promising; health good; prices stationary. Except <i>juar</i> and <i>bajra</i> , all <i>kharif</i> grains are cut; <i>rabi</i> sowings still in progress and are germinating well; prices stationary; fever prevalent; no cattle disease.
Agra ( „ 14th)	<i>Nil</i>	<i>Kharif</i> being harvested; <i>rabi</i> sowings continue, and standing <i>rabi</i> crops being irrigated; fever abating; general health good; prices stationary.
Bareilly ( „ „ )	· ·	Weather good; health much improved, and fever abating; <i>rabi</i> sowings completed; prospects excellent.
Meerut ( „ „ )	<i>Nil</i>	Health good; weather mild; <i>kharif</i> harvest nearly over, and <i>rabi</i> sowings about finished; markets fairly supplied; exports stopped; cotton coming into market.
Kumaun ( „ „ )	Slight drizzling on the 12th.	Rain wanted; health good; cattle disease continues; prices unchanged.
Lucknow (Nov. 14th)	<i>Nil</i>	Outturn of <i>kharif</i> harvest poor; <i>rabi</i> sowings completed, except in <i>dofasli</i> lands; rain much wanted; want of fodder felt; public health good.
Partabgarh ( „ „ )	· ·	Prices almost stationary; <i>bajra</i> yield light; irrigation going on; fever at Kanda, also slight cattle disease; cholera is dying out.
Sitapur ( „ „ )	<i>Nil</i>	Wind west during the week; <i>rabi</i> sowings completed, and crops being irrigated where water is procurable; prices steady.

Presidency or Province and District.	Rainfall for week preceding.	State of agricultural prospects.
<b>N.-W. P. &amp; Oudh—contd.</b>		
Fyzabad (Nov. 14th)	<i>Nil</i>	Irrigation going on; prospects good; cattle disease and fever still in part of district.
Rae Bareli (, 13th)	<i>Nil</i>	<i>Juar, urd</i> and <i>morhi</i> being harvested; <i>rabi</i> sowings completed; fever and cholera still continue; no cattle disease; prices stationary.
Cawnpore (, 14th)	<i>Nil</i>	Irrigated <i>rabi</i> crops flourishing; <i>kharif</i> harvesting in progress; health good; prices nearly stationary.
Farukhabad (, 13th)	<i>Nil</i>	<i>Rabi</i> sowings approaching completion; prices steady; fever decreasing.
		<i>General Remarks.</i> —No rain except a slight drizzle in Kumaun; rain wanted in Kumaun and Lucknow, otherwise prospects good. The <i>kharif</i> harvest continues; with the exception of the <i>kharif</i> crops in Lucknow and the <i>bajra</i> crop in Partabgarh, the outturn is fair; cholera is dying out; cattle disease continues in three districts.
<b>Punjab—(Nov. 14th)</b>		
Delhi . . . . .	<i>Nil</i>	Health good; prices stationary; average yield expected.
Hissar . . . . .		Rain wanted in Rohtak tehsil; health good; prices fluctuating.
Umballa . . . . .	<i>Nil</i>	Health good; prices stationary.
Jullundur . . . . .	<i>Nil</i>	Health good; prices falling.
Amritsar . . . . .	<i>Nil</i>	Health good; slight fall in prices.
Lahore . . . . .	<i>Nil</i>	Health good; prices steady; crop prospects good.
Ferozepore . . . . .	<i>Nil</i>	Health good; slight fall in prices; crop prospects good.
Sialkot . . . . .	<i>Nil</i>	Health good; prices steady; harvest prospects good.
Rawalpindi . . . . .	<i>Nil</i>	Seasonal fever still prevails; prices steady.
Peshawar . . . . .		Rain wanted; slight fever prevailing; prices steady.
Mooltan . . . . .	<i>Nil</i>	Fever abating; prices steady.
Dera-Ismail-Khan . . . . .	<i>Nil</i>	Fever still prevalent; prices steady; crop prospects good.
		<i>General Remarks.</i> —Health of the province is generally good; the crop prospects are also good; but rain is wanted in the Rohtak district of the Hissar division and at Peshawar.
<b>Central Provinces—</b>		
Nagpur (Nov. 15th)	. . . . .	Cool and pleasant; prospects <i>rabi</i> good; fever prevalent; prices steady.
Jubbulpore (, 14th)	. . . . .	Cool; <i>rabi</i> sowings almost finished; health good; prices unchanged.
Saugar (, 13th)	. . . . .	<i>Rabi</i> sowings excellent and progressing favourably; fever prevalent; prices steady.
Seoni (, 14th)	. . . . .	Clear and cold; <i>rabi</i> sowings completed; fever decreasing; prices stationary.
Hoshangabad (, 14th)	. . . . .	Cool and clear; <i>rabi</i> sowings progressing; fever prevalent; wheat 15 and rice 11 seers per rupee.
Raipur (, 11th)	36	Clear and chilly; <i>rabi</i> sowings progressing; fever continues; prices rising; rice 36 and wheat 29 seers per rupee.
Sambalpur (, 9th)	1.06	Cloudy and close; prospects good; fever continues; rice 56 seers per rupee.
Khandwa (, 14th)	. . . . .	Mornings clear and nights chill; <i>kharif</i> being reaped; <i>rabi</i> sowings progressing; cholera and small-pox prevalent; rice 13 and wheat 16 seers per rupee.
		<i>General Remarks.</i> —Weather growing cold and pleasant; <i>kharif</i> crops being harvested; <i>rabi</i> sowings almost finished and promise favourably; fever still reported; prices stationary.
<b>British Burma—</b>		
Akyab (Nov. 11th)	2.18	Total rainfall 201.64 inches; public health and health of cattle, both in town and districts, good; crop prospects good.
Rangoon . . . . .	.09	Total rainfall 101.55 inches; public health good; crops making progress.
Passein . . . . .	0.51	Total rainfall 124.97 inches; public health and condition of crop good.
Prome . . . . .	0.01	Total rainfall 50.06 inches; one death from cholera in town, otherwise public health good; the late rains have benefited the crops, and a fair yield is anticipated.
Amherst (Moulmein)	<i>Nil</i>	Total rainfall 202.90 inches; public health good both in Moulmein and the district; thirteen deaths of cattle reported in two townships; condition of crops good.
Toungoo . . . . .	0.03	Total rainfall 90.88 inches; seven deaths from cholera in one township and two in another, otherwise public health good.
		<i>General Remarks.</i> —A little cholera in Tavoy, otherwise public health good; crop prospects good; everywhere rains practically over.
<b>Assam—</b>		
Gauhati (Nov. 14th)	1.08	Weather seasonable; mornings cool and foggy; prospects of crops and public health good.
Sylhet (, 15th)	<i>Nil</i>	Subordinates are finding out that <i>sali dhan</i> will not be a good crop; <i>aman</i> promises well; still cholera reported from all directions.
Cachar (, , )	<i>Nil</i>	Weather, days hot and nights cool; prospects of <i>sali</i> crops favourable; sowing of winter crops progresses; common rice 25 $\frac{1}{2}$ seers per rupee; one case of cholera from Sader, two from Hailakandi and one case of small-pox from Katigoree reported.
Dibrugarh (, , )	0.83	Weather seasonable; prospects of crops good; cattle disease still present; public health good.

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Presidency or Province and District.	Rainfall for week preceding.	State of agricultural prospects.
<b>Mysore and Coorg—</b> Bangalore (Nov. 15th) Mysore . . .	62 11	Crops in very good condition ; prospects fair. Crops in good condition. <i>General Remarks.</i> —Rain has fallen throughout the province, except at Shimoga and Chitaldroog ; crops in excellent condition, harvesting of <i>ragi</i> , <i>navane</i> , wheat, &c., continues ; sowing of gram and sugarcane commenced in parts ; prospects very good ; price of <i>ragi</i> Bangalore 35 seers per rupee, Mysore 27½, Shimoga 23 to 4½, Chitaldroog 36 to 50 ; rice on an average 13 seers per rupee ; public health good.
<b>Berar and Hyderabad—</b> Amraoti (Nov. 15th) Akola . . . Hyderabad . . .	· · ·	Crops in good condition ; wheat 16, <i>jowari</i> 28 seers. <i>Kharif</i> crops progressing favourably ; <i>rabi</i> sowings completed. Reaping of <i>kharif</i> crops nearly concluded ; <i>abi</i> crops prospering ; <i>tabi</i> being sown ; general health good ; prices, wheat 16½, coarse rice 10½, white <i>jowari</i> 28, yellow <i>jowari</i> 33, and <i>tur</i> 24½ seers per hali sica rupee.
<b>Central India States—</b> Indore (Nov. 15th) Morar (Gwalior) . . . Sutna . . . Sehore . . . Neemuch . . . Goona . . . Agar . . . Nowrang . . . Manpur . . .	· · · Nil · · · · · · Nil · · · · · · · · · · · ·	Weather clear and colder ; prospects continue favourable. Weather seasonable ; health and prospects good. Health and prospects good. Weather cool ; health and prospects good. Sowing <i>rabi</i> in progress ; health good. Crops good ; fever prevalent ; wheat 22 seers per rupee. Report not received. Standing crops good ; health fair ; prices stationary. Weather clear and cool ; sowings of wheat continue ; prices steady.
<b>Rajputana—</b> Abu (Nov. 15th) Sirohi { " 12th) Ulwur { " 14th) Harowti ( " 11th) Ajmere ( " 14th) Jeypore ( " " )	· · · · · · · · · · · · · · · · · ·	Weather cold, seasonable ; fever abating. Tanks, wells, and health good ; crops cut ; nights cold. <i>Rabi</i> sowings continue ; <i>kharif</i> being harvested ; health fair ; prices steady. Outturn of <i>kharif</i> somewhat above average ; <i>rabi</i> sowing almost completed ; markets well supplied ; weather cooler ; health good. Getting colder ; sowing still continuing for <i>rabi</i> ; health good. <i>Rabi</i> sowings commenced ; prices stationary ; fever still prevalent.
<b>Nepal—</b> Katmandú (Nov. 10th)	Nil	Good rice crop ; beautiful weather.

E. C. BUCK,  
*Secretary to the Government of India.*

SUPPLEMENT TO THE GAZETTE OF INDIA, NOVEMBER 18, 1882. 1677

GOVERNMENT OF INDIA.

HOME DEPARTMENT.

TRANSFER OF THE LITTLE COCOS ISLAND AND PREPARIS ISLAND TO THE  
ADMINISTRATION OF BRITISH BURMA.

No. 1665.

*Extract from the Proceedings of the Government of India in the Home Department (Judicial),—  
dated Simla, 11th November 1882.*

Read again—

The following papers regarding the transfer of the Little Cocos Island and Preparis Island to the Administration of British Burma :—

From Chief Commissioner of British Burma, No. 685, dated the 25th January 1882.

To " " " No. 1015, dated the 17th July 1882.

To the Superintendent of Port Blair and Nicobars, No. 1016, dated the 17th July 1882.

Despatch from the Government of India to Her Majesty's Secretary of State for India, No. 24, dated the 22nd July 1882.

Read also the following papers :—

From the Superintendent of Port Blair and the Nicobars, No. G.-738, dated 12th August 1882.

Telegram from Her Majesty's Secretary of State for India, dated the 20th September 1882.

To the Chief Commissioner of British Burma, No. 1429, dated the 25th September 1882.

From " " " No. 294—36M., dated the 12th October 1882.

Despatch from Her Majesty's Secretary of State for India, No. 28, dated the 28th September 1882.

Endorsement to the Legislative Department, No. 1668, dated the 11th instant.

RESOLUTION.

The Governor General in Council is pleased to direct the transfer of the Little Cocos Island, which is situated in North Latitude 13° 57', and East Longitude 93° 26', and of Preparis Island, which is situated in North Latitude 15° and East Longitude 94°, from the Administration of the Chief Commissioner and Superintendent of the Andaman and Nicobar Islands to the Administration of the Chief Commissioner of British Burma.

ORDER.—Ordered, that this Resolution be published in the Supplement to the *Gazette of India* for general information.

A. MACKENZIE,  
*Secretary to the Government of India.*

GOVERNMENT OF INDIA.

REVENUE AND AGRICULTURAL DEPARTMENT.

PROGRAMME OF THE AMSTERDAM INTERNATIONAL EXHIBITION, 1882.

No. 288 M. and Ex.

*Extract from the Proceedings of the Government of India in the Revenue and Agricultural Department, dated Simla, the 14th November 1882.*

Read the following Despatch and its enclosures from the Secretary of State, regarding the International Exhibition to be held in Amsterdam in 1883 :—

No. 161, dated India Office, London, the 12th October 1882.

From—The Secretary of State for India,  
To—The Government of India.

I have received your letter of 29th July last, No. 2 (Exhibitions), stating that your Government has made a grant of Rs. 12,000 for the purpose of exhibiting a collection of Indian raw products at the proposed Amsterdam Exhibition, and asking that a space of 10,000 superficial feet may be reserved for India.

2. I telegraphed to you on the 22nd ultimo, asking whether the above-named space included any area required by Madras and Bombay, and from your reply dated the 27th ultimo I learn that such is the case. The necessary arrangements for reserving this space will therefore be made at once.

3. The enclosed papers issued by the Central Committee of the Exhibition will show the arrangements made as regards the dates of opening and closing the Exhibition, as well as the latest date for the reception of goods. As regards Indian exhibits, an endeavour will be made to obtain sanction for their admission up to a somewhat later date than February 1st next, and any arrangement that may be made concerning them will be communicated to you hereafter.

4. With reference to the request in the latter part of paragraph 3 of your letter under reply, I have appointed a Committee consisting of the gentlemen named in the margin to deal with all the necessary arrangements in London and Amsterdam connected with the forthcoming Exhibition, and I concur in your proposal that the Secretary in the Revenue and Agricultural Department should arrange all matters of detail in direct communication with the Secretary to the above Committee.

5. The Secretary in the Revenue and Agricultural Department will be furnished in due course with address labels for the cases to be despatched from India, and arrangements will be made for the reception of the goods on their arrival in Amsterdam.

KINGDOM OF THE NETHERLANDS.—CITY OF AMSTERDAM.

*International Exhibition of Colonial Objects and of General Exportation.—May 1883 October.*

GENERAL PROGRAMME.

The brilliant success achieved by the city of Amsterdam in obtaining a direct road of communication to the North Sea, and by which she has maintained her ancient reputation of being the first commercial city in the Kingdom, has given her a fresh stimulus to show renewed signs of life and energy in every department of human knowledge. A Committee, selected from the most influential men of the town, purpose to organise an International Exhibition of Colonial Objects and of General Exportation for the year 1883.

One of the principal objects of this Exhibition will be to promote the interests of the Dutch Colonies as well as those of the Colonies of other nations, who, it is confidently expected, will gladly support and patronise this work.

London, Paris, Vienna, and other important places, in the latter part of the present century, have successively collected at their Exhibitions the products of Trade and Industry, of Agriculture and Horticulture, of Science and Art, in a manner calculated to raise the admiration of the whole world.

Of late years the great cities of the New World, Philadelphia, Sydney, and Melbourne have successfully followed their example.

As one of the eldest Colonial Powers, Holland would claim the privilege and the honour of taking the initiative in organising a concourse between the various colonising peoples, such as has never yet taken place.

The Committee selected for the execution of this project is convinced that an Exhibition of this kind, whilst spreading a new light on the Colonies in general, cannot fail to be of immense interest.

Much as has been done for stimulating the spirit of enterprise, and securing the success of fresh commercial designs, there still remains a great deal to achieve in propagating a vaster knowledge of those countries, whose inexhaustible wealth of the soil only wants knowledge and capital—those powerful levers of our age—in order to contribute most thoroughly to the universal prosperity.

There is perhaps no fitter medium for the spreading of more knowledge concerning Colonies than a Colonial Exhibition, where, with the aid of History and Science, is shown what those Colonies were and what they actually are.

The projected Exhibition will be subdivided into five great departments:—

1st.—Colonial Exhibition.

2nd.—General Export-Exhibition.

3rd.—Retrospective Exhibition of Fine Arts and Arts applied to Industry.

4th.—Special Exhibitions.

5th.—Scientific Lectures and Meetings.

ART. 1. The Colonial Department forms the main basis of the Exhibition.

A comparative inquiry into the various systems of Colonisation, of tropical Agriculture, of the Exploitation of the treasures of the soil, promises to be a useful and original labour, worthy of the general interest.

This Exhibition should not be limited to a mere show of materials and products, but must also offer an opportunity of comparing the manners and customs of the natives of the trans-Atlantic regions.

Public works and means of conveyance, as being the foundations of prosperity and civilisation, should form part of the Exhibition.

It is likewise thought desirable to represent specimens from the fauna and flora of the Colonies, as images of the luxuriant nature of the tropical countries.

Finally, the Army and Navy, those bulwarks of liberty, should not be wanting.

ART. 2. The second department will contain all that belongs or relates to the General Export Trade. A vast space will be set apart for Industry as applied to the transformation of matter, whilst Industry and Commerce will find ample opportunity for honest competition.

ART. 3. In the third department will be exhibited specimens of Art from the remotest times, as an instructive picture of the ideas that have existed with regard to them among the original peoples, and how these ideas have been developed under the influence of civilisation.

A comparative inquiry into the fine arts of different periods and nations seems highly interesting.

ART. 4. The object of the fourth department is that of Temporary Exhibitions. These will be for the greater part of a national character, so as to show the native products of Agriculture and Industry and as tending to promote the general interest.

ART. 5. The fifth department is the intellectual part of the Exhibition. Scientific lectures and meetings will offer an opportunity to the men of science, those pioneers of civilisation, to communicate their ideas on and discuss the interests of Trade and Industry, of Science and Art, International Law, Education, Hygiene, &c.—Colonial Economy, especially the relations between the mother-country and colony, will occupy a first place in the list of interesting subjects of discussion.

The interests of mankind are universal, as the human genius is.

We venture to hope that the invitation which the Dutch Government will forward to the other European Powers, for a hearty support of the Colonial Exhibition of Amsterdam, will meet with a favourable reception, so that by a general co-operation a complete success may be secured.

Even the mightiest nations will profit by occasionally entering into intellectual contests with their rivals, be it only for the purpose of showing that power and wealth, supported by moral and intellectual energy, will ever continue to deserve the esteem of the whole civilised world.

Extending the commercial operations, encouraging industry, raising the moral force of nations, strengthening the bond of union among the peoples,—those will be the salutary fruits of so many united efforts, both for the colonies and the mother-country.

*For the Executive Committee.*

AMSTERDAM, August 15th 1881.

D. CORDES, President.

S. DE CLERCQ, Wzn., Deputy Member.

E. AGOSTINI, General Commissary.

J. KAPPEYNE VAN DE COPPELLO, Secretary.

## GENERAL REGULATIONS.

## FIRST SECTION.

*Patronage, Commission of Organisation, Executive Committee, General Commission, Provincial and Colonial Committees, Foreign Commissions.*

*Article I.*—Under the high Patronage of His Majesty the King of the Netherlands and of the Government of the Netherlands, and under the honorary presidency of His Excellency the Minister of Colonies, an International Colonial and General Export Trade Exhibition will be held in Amsterdam in the year 1883.

This Exhibition will contain—

- 1°. Produce of the Colonies.
- 2°. Articles of General Export.
- 3°. Works of Art and Antiquities.

It will give opportunity for competitive exhibitions of—

- 4°. Living Animals, Flowers, Fruit, &c.
- 5°. For Congresses and Conferences.

It will be opened on the 1st of May 1883 and have a minimum duration of five months.

*Article II.*—The Exhibition is organised by a Commission called the Committee of Organisation. It is placed under the direction of an Executive Committee, represented by a Delegate.

The administration and general management is entrusted to a Commissioner General.

*Article III.*—Provincial and Colonial Committees are formed, having for function—

- 1°. To make known within their province the object and purport of the Exhibition.
- 2°. To promulgate informations concerning its organisation and to distribute the forms for requests of admission and all other documents.
- 3°. To find out the most prominent inhabitants of colonies, agriculturists, manufacturers, artists, &c., whose admission to the Exhibition would tend especially to enhance its solemnity; and to indicate the importing merchants, exporters, &c., fit to lend efficacy to the organisation for competition.
- 4°. To call forth exhibitions of agricultural and horticultural products of the colonies and provinces.
- 5°. To call forth and, eventually, to organise the collective grouping of similar products of the colonies and the provinces, and to accredit to the executive committees Delegates charged with representing each collective exhibition.

*Article IV.*—The Foreign Commissions appointed by the several countries at the request of the Government of the Netherlands are invited to communicate as early as possible with the Executive Committee, and to have themselves represented there by Delegates.

Each Delegate will be appointed to treat with the Commissioner General on questions touching his nation.

## SECOND SECTION.

*Commissioners of Groups, Juries, Rewards.*

*Article V.*—For every group in the Exhibition of the Netherlands and the Dutch Colonies a special commissioner will be appointed charged with—

- 1°. Preparatory labours for the organisation of his group.
- 2°. Transmitting to the Commissioner General all claims of his exhibitors, and to detect all breaches of the rules, which he is bound to execute strictly.

The Foreign Commissions or their Delegates are charged with presiding at the installation of the exhibits of their nation.

*Article VI.*—Rewards will be granted by an International Jury.

The Jury will be divided into sections corresponding to the groups and classes of the Exhibition.

*Article VII.*—The rewards will consist of—

- 1°. Diploma of Honour.
- 2°. „ for Gold Medal.
- 3°. „ „ Silver Medal.
- 4°. „ „ Bronze Medal.
- 5°. „ „ Honourable Mention.

Every Diploma of Medal will be accompanied by an official Medal of Bronze.

These rewards will be apportioned on the reports of juries to the exhibitors whose contributions are pronounced to be of incontestable superiority.

A special regulation for the procedure of the jury will be drawn up later.

#### THIRD SECTION.

##### *Arrangement of Products.—Catalogue.*

*Article VIII.*—The articles exhibited will be arranged for every nation into nine groups for the two first divisions. Each group is divided into classes according to the system of the General Classification.

*Article IX.*—An official catalogue of the produce of all nations and the names of the exhibitors will be drawn up in the French and Dutch languages.

#### FOURTH SECTION.

##### *Admission of Exhibitors.—Installations.*

*Article X.*—Applications for admission will be sent up to the Commissioner General and submitted to the Executive Committee, which will decide in the highest instance as to the admission of the applicants.

The Commissioner General will be charged with sending the certificates of admission to every admitted exhibitor.

*Article XI.*—The space allotted will be placed at the disposition of the exhibitors, subject to the following charges:—

Galleries of the main building.	For every superficial meter	...	25	guilders.
" " "	" " "	for isolated spaces	...	50 "
Annex galleries in the gardens	" " "	" " "	...	12,50 "
Space in the open air	" " "	" " "	...	7,50 "

*Article XII.*—The industrial exhibitors requiring water, gas or steam must state so on applying for admission, indicating the quantity of water, gas or steam required.

The supply of water, gas or steam furnished by the administration is subject to a proportionate charge, regulated according to a special tariff, which will be at the disposal of parties interested.

*Article XIII.*—The exhibitors that are admitted will receive in due course all the necessary informations, particular regulations and printed addresses for the despatch and transport of their products.

The addresses will contain the following printed indications:—

- 1°. The number of the group.
- 2°. " " " class.
- 3°. " labelled address as follows:—

International Exhibition of Amsterdam, 1883, Amsterdam, Netherlands.

Colonial Section or Section of General Export or, &c., &c.

The packages must bear on one side of the address in large characters and on paper of the national colours:—

- 1°. The nationality.
- 2°. The name of the exhibitor.
- 3°. His address.
- 4°. His consecutive number.

*Article XIV.*—The Exhibition enclosures will be constituted bonded warehouses, where the foreign products will be admitted as in transit.

*Article XV.*—Every exhibitor must attend either personally or through his agent to the despatch, transport, and reception of his packages, as also to the declaration of their contents.

If the exhibitor or his agent is not present to receive the packages on their arrival within the enclosures of the Exhibition, the supervisor will be charged to remove them immediately and store them at the expense of the exhibitor.

*Article XVI.*—The exhibitor who shall not have staled his contributions before the 20th April 1883 will lose all his right on the space allotted ; his application for admission and the certificate addressed to him will be considered null and void. The Commissioner General, after conferring with the Executive Committee, shall have the power of disposing immediately of the space allowed for his exhibits, without any judicial or extra-judicial formalities.

*Article XVII.*—The cases and other wrappings of packages after unpacking must be removed by the exhibitors or their agents ; if not, they will be removed under the direction of the administration, without the latter incurring any responsibility in the discharge of their duty, and this at the expense of the exhibitor.

The storing and keep of empty cases, &c., will take place at the charge of the exhibitors, and must be done outside the enclosures of the building, either by themselves or by the supervisor, after a special tariff.

It is distinctly understood that all the cost of packing, transport, keeping, unpacking, putting up and return, &c., &c., will be at the expense of the exhibitor.

Immediately after the close of the Exhibition, the exhibitors must proceed to remove their exhibits. This operation must be completed by the 31st December 1883.

After this date, the products, packages, &c., which shall not have been withdrawn by the exhibitors or their agents, will be removed officially, and stored at the expense, risk and peril of the exhibitors.

The articles which shall not have been withdrawn from the storehouse on the 31st May 1884 will be put to public sale, and the net proceeds handed to the Municipality of Amsterdam for the benefit of the Poor Fund.

#### FIFTH SECTION.

##### *Administration and Police.*

*Article XVIII.*—All Colonial products and articles of exportation are admitted into the Exhibition, save the following :—

Detonating and explosive materials, and, in general, every article considered dangerous.

Spirits or alcohol, oils and essences, corrosive materials, and, in general, whatever may damage other exhibited products or incommode the public, will not be received excepting in solid and appropriate receptacles and of limited sizes.

Percussion caps, fireworks, chemical matches, and other analogous objects, cannot be received except in imitated form and without any addition of inflammable material.

*Article XIX.*—The Commissioner General, in consultation with the Executive Committee, has the absolute right to cause the withdrawal of all products of such substance, which from their nature or appearance may seem to him to be dangerous or incompatible with the aim and propriety of the Exhibition.

*Article XX.*—Products are exhibited under the name of the signatory of the application ticket. This condition will be strictly adhered to.

The exhibitors are invited to indicate within the space of their stall the names of their co-operators, whoever they may be, that have contributed, in what manner soever, to the excellence of the products exhibited.

They are particularly invited to state the selling price of the articles exhibited.

*Article XXI.*—The exhibitors will be permitted to sell their articles, but cannot remove them during the hours that the Exhibition remains open : when removed, they must replace them immediately by articles of the same nature.

They are in such case to provide themselves with a permissive pass.

The articles produced on the spot can at once be delivered to the purchasers.

Drinks and products for consumption sold on the spot are subject to a special agreement.

*Article XXII.*—No article or object whatsoever shown at the Exhibition can be imitated, copied or reproduced under whatever form, without a special authorisation from the exhibitor and from the Commissioner General ; the latter reserves the right of authorising the reproduction of collective groups.

*Art. XXIII.*—An entrance card is delivered gratis to every exhibitor. This card is personal.

It will be withdrawn if it be found to have been lent or ceded to another person, and this without prejudice to the right of prosecuting the delinquent.

The card must be signed by the exhibitor, bear his photograph and the number of group and class to which he belongs.

It must bear, moreover, the stamp of the Commissioner General.

*Article XXIV.*—The exhibitors are allowed to be represented by agents of their choice, agreed to by the Executive Committee.

The personal cards of free entry will be delivered to the agents under the conditions enumerated in the preceding article.

The representative of an exhibitor will not be allowed to have more than one entrance card, whatever be the number of exhibitors he represents.

*Article XXV.*—The Executive Committee will take the necessary measures to secure the articles exhibited against every damage, but will in no case be responsible for fires, accidents deterioration or damages which they may undergo, whatever the cause or extent.

The Committee leave the exhibitors to attend to the insurance of their goods, immediately and at their own expense.

It will furnish the necessary persons for guarding the articles exhibited, but it will not be responsible for thefts or irregularities which may be committed.

*Article XXVI.*—All communications relative to the Exhibition must be addressed by the exhibitors and others interested to the *Commissioner General of the International Exhibition of 1883, Amsterdam, Netherlands.*

#### SIXTH SECTION.

##### *Supplementary Exhibitions.—Congresses and Conferences.*

*Article XXVII.*—Supplementary Exhibitions, competitions, congresses, conferences, lectures, reports, &c., will take place during the Exhibition.

*Article XXVIII.*—The Executive Committee will invite International Congresses on all questions subject to diversity of opinion and action, and lend their assistance to all projects the realisation of which they consider likely to increase the importance and success of the Exhibition.

#### *Special Regulation.*

Natives of the Netherlands and foreigners who become exhibitors, are thereby held to declare themselves bound to conform to the present general regulations, as well as to the special rules hereafter to be enacted.

*Dated in Amsterdam, 15th December 1881.*

*For the Executive Committee.*

D. CORDES, *President.*

S. DE CLERCQ, *Wz., Delegate.*

E. AGOSTINI, *Commissioner General of the Exhibition.* J. KAPPEYNE VAN DE COPPELLO, *LL.D.*

*Secretary.*

#### APPENDIX I.

##### *Explanatory remarks to the Programme for the Colonial Section of the International Colonial and Export Trade Exhibition.*

In framing the programme for this Exhibition its object, to wit, "the extension and a more general diffusion of the knowledge regarding the Colonies and extra-European possessions of the different Powers," has been kept in view as much as possible. The authors have considered it the best means of attaining that end, by dividing the programme into three distinctly characterised chief groups, and by sub-dividing these into classes which, as it were, constitute the units thereof.

In Group I, "the physical conformation of the colonies and possessions," Natural Science in its strictly critical sense is the primary object. Moreover, as basis for the development of both the succeeding groups, it is destined to embrace all such data which may contribute towards the knowledge of the soil and its productions, of natural forces acting thereon, the races and tribes inhabiting it, its realms of plants and animals.

In both the succeeding groups we have endeavoured to include everything connected with the life and doings of the different classes of the populations in the colonies, with the object of giving a clear and exact representation of them.

Although completeness has been the aim, we do not contend that the limit of perfection has been attained, and, perhaps, much has been withheld or forgotten which nevertheless strictly belongs to an Exhibition, and contributions of which would therefore be desirable.

In each class under the three groups objects are mentioned contributions in which would be particularly welcome, and on which the authors intended to draw special attention. It should be remembered, however, that we have done so in a descriptive, not in a limited, sense, so that articles not mentioned are not necessarily therefore excluded.

A few explanations may render our meaning more clear, and show that what may appear to have been omitted in one group will sometimes be found in another.

In the second class of the first group, "meteorology and terrestrial magnetism," mention is only made of charts, tables and graphical diagrams. We had then, as regards the Netherlands Indian possessions, mainly in view the series of magnetical and meteorological

observations made in Batavia by Dr. P. A. Bergsma, and published by order of the Netherlands Indian Government, as well as the magnetical survey of the Indian Archipelago by Dr. E. van Rijckevorsel, the report of which is accompanied by charts on which the lines of equal magnetical intensity and those of inclination and declination are indicated.

Similar contributions may also be expected from other countries, and are of the greatest importance to science. Besides, comparisons instituted by means of the exhibition of instruments used or required for such observations are of the highest value, since it has often been proved, also recently at the Geographical Exhibition held at Venice, that the acquaintance with instruments as used by different nations is unequal and far from common. These meteorological and other instruments were, however, ranged in our programme under the 3rd group, letter *B*, of the 23rd class.

In the 4th class of this group, "*Geology and Mineralogy*," Palaeontology, or descriptions, sketches and exhibitions of fossils have not been mentioned in so many words, but it was considered desirable to draw attention thereto in an especial manner in the explanatory remarks, owing to the great importance of this branch of geology. Liberal and well chosen contributions of both articles and pictures, with descriptions of them as well as of the places of origin and their vicinity, are earnestly invited.

The demands of the 6th class of this group, "*Animals*," are various, and it was not feasible to mention all in the programme.

The researches in natural history do not only require animals and constituent parts, hides, skins, tender organisms, &c., preserved in serviceable condition, but also full descriptions and drawings mentioning the place of origin, species, native names, tables of measurements, &c.

Monographs of multifarious species found in different climes, or of species conspicuous from their close connection with the mother-country or other lands, are very desirable, and their value will be enhanced by explanatory collections and drawings.

Of the 4th or last class of this group, "*Anthropology*," besides the foregoing, communications or contributions are very much desired of every thing which could bring out conspicuously the difference of races and the form of development of man, from the most barbarous up to the most civilised races.

"*Furniture*" in the 9th class, *II* group, mentioned under letter *B*, must be taken in the most liberal sense, so that it would comprise furniture for ease and luxury, cooking and washing utensils, means of illumination and heating, implements for making fire, riceblocks, and such like.

In sending head-gear, turbans, mantles, ponchos, sarongs, loincloths, &c., comprised under letter *C*, "*Clothing and Finery*," it is desirable to accompany them by elucidations regarding the manner in which they are worn by the natives. Such can be done by means of drawings or painted figures, but it is hardly necessary to add that dressed figures of natural size would be extremely welcome.

In the year 1878, "*Models and instruments used in diamond digging and polishing at Banjermassin*" were exhibited in Paris. Similar articles are also invited for this Exhibition and ought to be classed under the 10th class letter *F*, "*Mining*."

As regards letter *G*, "*Industry*," it would be of importance to illustrate under this class the gradual processes previous to completion and fitness for use, by exhibiting the products in their different stages of treatment.

It would be extremely difficult, if not impossible, to exhibit in this country sea and river craft, fishingsmacks, and other conveyances by land and water, as they are used by the natives in the colonies. It has therefore been decided to limit contributions under letter *H*, "*Trade and Navigation*," to models and drawings which, however, to be of value, ought to be made in exact proportions, with indication of scale, and be accompanied by a description of the construction and joints, &c.

It would, however, not be quite impossible to bring over rowing and sailing-craft and transports of small description and to allot them place in the Exhibition. This applies equally to sleighs and sedan-chairs, which, together with harnesses, saddles and whips, should be classed with means of land transport.

Among the conveyances by land choice should rather be made of those conspicuous by elegance, strength, lightness or adaptedness as excellent rowing and sailing-boats. Among craft such attention should be given as much to elegance in form as to particular excellence in its use.

Also specimen of planks and knees to illustrate native ship-building are greatly desired.

Among ship's requisites are particularly included tackle and sails, cordage, anchors, oars, paddles, &c.

In the 13th class, "Forms of Government and States Institutions," under the heading *Military*, communications are invited regarding modes of warfare, usages in war, and the art of fortification by the natives. It has been proved, especially in later times, that some native peoples are far from being unskilled in that art; hence, in order to demonstrate the progress of such peoples in the construction of defensive works, it is considered desirable to accompany these communications by models of forts (bentings), redoubts or other earth or stone defences. Contributions in these are therefore earnestly solicited.

Under the title "Public Buildings," letter E, models and sketches of which are desired, no special mention has been made of palaces or dwellings of native chiefs or grandees, as being comprised among dwellings of chiefs; yet it is obvious that contributions in such will be greatly appreciated.

Regarding the 10th class in group III, "Naval and Military Forces in the Colonies," it is to be observed that by "means of fortification and defence" is meant in the widest sense everything which belongs to the living or dead fighting forces of a country, or is destined for the organisation, preparation, exercise and equipment of armies and fleets; among which may also be mentioned marine wharfs and establishments for the construction of steam engines, armourplates, gunfoundries and pyrotechnical ateliers, and particularly institutions for the education of officers and non-commissioned officers, and asylums for invalids and old soldiers who do not return to civil life.

The definition of the 17th class, "Public Works," has been purposely given in general terms, in order to embrace everything that has been done in the Colonies by Governments, private companies or individuals, for general benefit and use, such as rail and tramways and engineering constructions therewith connected, bridges and river passages, the building of harbours and docks, digging of canals, the improvement of rivers, irrigation works, drainage of lakes, the construction of breakwaters, dikes and dams, and the erection of buildings for the public service or for general benefit.

Finally, it must be remarked that where statistical data and comparative statistics regarding navigation, commerce, industry and agriculture are mentioned, particularly in the third group, graphical descriptions of the movements on these various subjects, although not expressly stated, are nevertheless much desired, as being best calculated to place such movements to view in a distinct manner.

#### *Hints to Contributors to the Colonial Exhibition.*

It is absolutely necessary that exhibitors do accompany their contributions by such careful explanations and details as may be required to fully indicate the nature, the use and application, the origin, the composition, and value or price of the articles, and which are also indispensable for the drawing up of a good and explanatory catalogue.

It need hardly be added of how much importance such a catalogue would be for the many exhibitors themselves, especially for those who exhibit the products of agriculture, art-machine and manual-industry, as it is also scarcely necessary to show how much the usefulness of the Exhibition would thereby be enhanced.

Objects classed in the II group of the Colonial Section must be ranged under the name by which they are known in the country of their origin, but must also have the nomenclature which European colonists or European countries may have given them.

The value of the contribution would be enhanced by a description, or rather by the addition of samples of the materials out of which they are made.

Simple articles in daily use by the natives, indicating their morals, customs, and way of living, nature and degree of culture, are more desired than costly articles or those in less general use, betraying European influence. Even repaired articles have a peculiar value, as indicating the manner in which the repairs are done. Such articles, showing the skill of the native people to imitate European art and compete with it, should neither be omitted.

Small but carefully selected collections tending to improve the knowledge of the people and country and advance their prosperity, are valued more than large or even costly collections where these objects have not been kept in view.

In sending models, care should be taken that all the proportions of the original have been faithfully reproduced, whilst it would be advisable to state also of what kind of wood or raw material they are made of. In case that the models require to be taken to pieces for transit, the different parts should be marked with numbers or letters in pencil (if possible twice repeated) referring to a list or sketch indicating the manner in which the parts are to be joined.

It is requested not to label the articles, as during the voyage the labels frequently fall off or become detached through moisture. It would be better to write the numbers or letters in pencil on the articles, which are then detailed in a separate list.

Seeds liable to spoil through damp or otherwise should be rather despatched in tins or stoppered bottles.

It is advisable when packing to put camphor or insect powder in the cases, and to rub in iron or steel articles with a little grease, or, what would be better still, with some vaseline.

It is earnestly solicited not to hold any so-called preparatory exhibitions, if the cases have thereby to be opened after despatch by the sender. Experience has taught that through that cause articles reach in a damaged, and sometimes quite unserviceable, condition. For nobody can be expected to attend better to a good and careful packing than the owner or exhibitor himself.

Thus the cases ought to reach the Exhibition building unopened, and should be opened there first.

The latest date on which goods can be received has been fixed as *1st February 1883*.

If sent later, the risk is incurred of their not being accepted.

As regards India, an endeavour will be made to obtain a slight extension of time.

The packages destined for the First Section should be marked distinctly on at least two contiguous sides, thus :—

"EXHIBITION, AMSTERDAM, 1883.  
Colonial Section."

#### PROGRAMME OF THE COLONIAL SECTION.

The Exhibition will embrace the Colonies and extra-European Possessions of the different Powers. Nations without Colonies or Possessions abroad may contribute towards the Exhibition, provided they trade or are connected with Colonies, or in case they have advanced the knowledge of such parts through charts, books, collections of the products thereof, &c.

The Colonial Exhibition is divided into three general groups :—

- I.—Physical conformation of the colonies and possessions.
- II.—Their native populations.
- III.—The Europeans in such countries and their relation towards the natives.

#### 1ST GROUP.

##### 7 CLASSES.

###### *Physical conformation of the Colonies and Possessions.*

- 1ST CLASS.—*Geography.* Descriptions, atlases, charts, plans, reliefs, profiles, &c.
- 2ND „ *Meteorology and Terrestrial Magnetism.* Charts, tables, and graphical diagrams.
- 3RD „ *Scenes*, by means of paintings, drawings, engravings, lithographs, photographs, &c.
- 4TH „ *Geology and Mineralogy.* Zoological and mineralogical descriptions, pictures and collections.
- 5TH „ *Plants.* Live and dried plants, pictures of plants and descriptions of the Flora.
- 6TH „ *Animals.* Stuffed and otherwise preserved animals. Pictures of animals and descriptions of the Fauna.
- 7TH „ *Anthropology.* Descriptions and pictures, casts, skulls, preserved heads.

#### 2ND GROUP.

##### 6 CLASSES.

###### *Native Populations.*

(By which is understood all inhabitants not of European race.)

- 8TH CLASS.—*Statistics of population* in tables and graphical diagrams.
- 9TH „ *Domestic and social life*—
  - (a) Pictures and models of cities and villages, dwelling houses, shops, workshops, &c.
  - (b) Furniture.
  - (c) Clothing and Finery. Toilet requisites, designs of tatoo-processes and instruments.
  - (d) Dietary. Utensils for preparation, use and preservation.

(e) Stimulants. Utensils for preparation, use and preservation of tobacco, betel, opium, drinks, &c.

(f) Morals and Customs. Pictures, paintings, drawings, sketches, costumes, arms or other objects illustrative of ceremonies and customs, such as betrothals and marriages, pregnancy and births, death and burial, contracts and oaths. Sports and popular games, and objects and pictures thereto appertaining.

(g) Pauperism. Communications regarding the means of counteracting it. Poor laws.

10TH CLASS.—*Means of subsistence—*

(a) Sport and Fisheries. Apparatuses and instruments for capture and treatment of animals, as—traps, drummets, fences, nets, lines, hooks, harpoons, darts, nooses, cages, &c. Fishing craft and models thereof. Produce of the chase and fishing, as ivory, horns, musk, skins and hides, pearls, mother-o'-pearl, coral, tortoise-shell, amber, dried fish, &c.

(b) Cattle-breeding. Statistics of cattle markets in tables and graphical diagrams.

Pictures of cattle, buffaloes, horses, sheep, &c., indigenous or cross breeds; with quotations of prices.

Products derived from cattle, as—horns, hides, wool, dairy produce, &c.

Instruments for feeding, dairy manufacture, wool shearing, &c.

Cattle marks, pictures and stamps.

Cattle bells, shepherds' tools, stables and fences.

(c) Breeding of useful insects, such as silkworms, bees and cochenille-insects. Utensils and samples.

(d) Agri. and Horticulture. Products of agri and horticulture obtained by native means, such as sugarcane and tobacco for home use, pepper, betel, gambier, rice, Indian-corn, and other cereals; arrowroot, sago, kapok, cotton, cocoa, &c.

Models and drawings of waterworks and means of irrigation.

Implements for agri and horticulture, such as ploughs, harrows, shovels, spades, hatchets, grasscutters, choppers, scythes, &c.

Lofts and sheds.

(e) Forest produce, as samples of wood for house and ship building; for piers, embankments and bridges; for the manufacture of furniture, agricultural implements, instruments, weapons, &c.; for charcoal, &c.

Resins, gums, rattans of different descriptions, bamboos, wax, aconyte, oils and fat, fibrous stuffs, colouring matters, wild nutmegs, massooey.

(f) Mining. Mining explorations, gold and diamond washing, salt boilings, &c. Implements and samples. Eatable clay.

(g) Industry. Spinning, weaving, thrashing, dyeing, cotton printing, tools, models and samples.

Spun yarn, fibrous materials, raw materials, &c. Implements and samples.

Basketry, rope and matwork, raw materials. Implements and samples.

Paper manufacture. Materials, tools and samples.

Workmanship in precious stones, gold, silver, iron, stone, clay, wood, leather, &c. Tools, models and samples.

Preparation and manufacture of animal substances, such as amber, musk, wax, honey, ivory, horn, bones and teeth, tortoise-shells, shells, skins and hides, feathers, hairs, &c. Tools and samples.

Preparation of popular drinks. Materials, utensils and samples.

(h) Trade and Navigation. Review of the inland trade in tables and diagrams. Review of maritime trade, as coast trade and foreign commerce driven by natives, models and drawings of crafts and other means of transport by land and water for the inland trade.

Models and designs of craft for the native sea-trade. Sea-charts and instruments. Ship's requisites.

Charts, drawings or models of communications by land and water, bridges, marketplaces, sale exhibitions, and other institutions in favour of commerce.

Examples of the native modes of packing. Coins, measures, and weights. Seals and trademarks.

11TH CLASS.—*Arts and Sciences*—

- (a) Drawings, paintings, engravings, sculptures and lacquered ware.
- (b) Music and musical instruments.
- (c) Stage appurtenances and dramatrical representations.
- (d) Calligraphy and printing-materials and samples.
- (e) Education. Reports on the organisation and results of native education.  
Models and plans of school buildings.  
Means of instruction and school furniture.  
Educational schemes and school rates.

12TH , , *Religion and Religious Customs*—

- Descriptions, models or copies of temples, mosques, &c.
- Idols.
- Images of priests, female priests, astrologers, soothsayers and objects in use in the discharge of their avocations.

13TH , , *Forms of Government and State Institutions*—

- (a) The present and early forms of Government. Literature.  
Pictures of princes, grandees and chiefs. Their symbols of distinction and dignity. Flags and banners.
- (b) Military. Communications on the modes of warfare, customs of war, and arts of fortification.  
Means of attack and defence.  
Arms, war garbs and equipment. Martial music.  
Attributes and drawings of heralds and champions.  
Symbols of challenge and truce.
- (c) Means for maintaining public peace and safety.  
Contributions to the knowledge and conduct of the civil police.  
Spearforks, handcuffs, stocks, &c.
- (d) Judicial institutions and customs. Laws, placards, and other contributions to the knowledge of native judicial institutions.  
Objects in use in judgments by ordeal. Drawings or models of instruments of punishment and torture.
- (e) Public buildings. Models or pictures of houses of chiefs, communal buildings, guard-houses and prisons.

## 3RD GROUP.

*The Europeans in Colonies and their relation towards the natives.*14TH CLASS.—*Voyages of discovery and investigation*.

- Descriptions and charts.

15TH , , *Colonial systems, their application and results*. Charters and Octrois.

- Laws and rules, principally relating to administration and justice.  
Literature.
- Books on Colonial policy and economy.

- Decorations and honours exclusively for the Colonies.

16TH , , *Naval and Military Forces in the Colonies*.

- Means of fortifying and defence, descriptions, drawings and models.

17TH , , *Public Works*. Descriptions, plans, or, projects, models, charts, designs, or other drawings.18TH , , *Telegraphy and Post Office, Telephones and Signals*. Instruments, models and drawings, postage stamps and seals.19TH , , *Commerce and Navigation in and with the Colonies*.

- (a) Literature on commercial law and treaties of commerce and navigation.

- Tariffs of import, export and transit, pilotages and port dues. Harbour Regulations.

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- (b) Statistics of trade and navigation.
  - Comparative statements of trade and navigation prior to and after the reduction and abolition of import, export and transit duties.
  - Comparative statements of trade and navigation of the colonies with their mother countries and foreign lands prior to and after the abolition of differential duties.
  - Comparative statements of the proportion of steamers and sailing vessels in the trade movement.
- (c) Communication by land and water.
  - Ways and means of transport. Descriptions and models.
  - Steam, sailing, and rowing crafts, wharfs, docks, lighters, diving apparatuses, cranes, &c. Models, drawings and sections.
  - Statistical data regarding traffic in connection with tariffs, particularly as to Railways.
- (d) Communications relative to institutions of commerce and credit.
- (e) Coins and coinage. Stamps.

20TH CLASS.—*Agriculture and industry*—

- (a) Description of agriculture aided by Europeans on proprietary, leased or farmed lands.
- (b) Agricultural implements or models, drawings and descriptions.
- (c) Agricultural establishments. Models or drawings and descriptions.
- (d) Agricultural handbooks.
- (e) Agricultural statistics in diagrams showing the increase and decrease of produce, rise and fall of prices, increase and decrease of cost of production.
  - Comparative returns regarding Government and private cultivation.
- (f) Agricultural products. Samples.
- (g) Forest cultivation. Description of the cultivation of forests by Europeans. Implements and instruments, charts, drawings, photographs and models.
- Products. Models of kinds of wood, which are already in use in the colonies for mining, shipbuilding, &c., and samples of sorts of wood to be recommended for export to Europe.
- (h) Mining, metallurgy and artesian wells.
  - Laws and regulations.
  - Mining. Description of experiments, construction of mining establishments, mining explorations, rockboring, illustrated by models, charts, sketches, sections, drawings and photographs. Instruments and implements, or models and drawings. Samples of the products.
  - Metallurgy. Descriptions of metallurgical establishments and processes, illustrated by models, plans, profiles and drawings. Instruments and implements or models and drawings. Samples of produce.
  - Artesian Wells. Descriptions of artesian means of water-supply, means of boring, boring instruments, illustrated by charts, plans, profiles, drawings, photographs and models.
- (i) Industry.
  - Machine and manual industry. Descriptions. Models, instruments and products.

21ST , , *Domestic and social life of the European*—

- (a) Necessaries for the passenger to and from the colonies, and for the pioneer and the scientific traveller.
- (b) Life in the colonies.
  - Copies or models of dwellings.
  - Furniture, clothing.
  - Diet.
  - Recreations and amusements differing from those of the European.
  - Objects used in such, with drawings.
- (c) Pauperism. Information regarding pauperism and means of alleviating it, and Poor laws.

22ND CLASS.—*Education and Instruction*—

(a) Preparatory, lower, middle and higher instruction.

Laws and regulations.

Schemes of instruction and school-rates, school-requisites and means of instruction.

Drawings and models of schools.

Educational statistics.

Reports and literature.

(b) Missionary labour. Information regarding the activity of missionaries and results obtained.

23RD „ *Scientific Research*—(a) Requisites for forming scientific collections, *viz.*, animals, plants minerals, geological specimens, ethnological objects, &c. Means of preserving, cabinets and labels.

(b) Instruments for scientific observations such as astronomical means of determining latitudes, measurement of levels, surveys, hydrographical surveys, meteorological and magnetical observations.

(c) Printing. Products—books, periodicals, journals and weekly papers illustrations. Stereotype plates, frames. Binding.

*The Colonial Committee.*DR. P. J. VETH, *Honorary Chairman.*M. P. PELS, *Chairman.*I. J. VAN SANTEN, *Secretary.**The Central Committee.*D. CORDES, *Chairman.*S. DE CLERCQ WZ., *Delegated Member.*J. KAPPEYNE VAN DE COPPELLO, *Secretary.*

## PROGRAMME OF THE SECOND SECTION.

*Exhibition of Articles for export to the Colonies and Trans-oceanic Possessions.*

## GROUP IV.

*Furniture and Upholstery.*24TH CLASS.—*A.*—Joinery and cabinet-work. Furniture in every sort. Wicker-work.

Bedsteads and accessories.

Billiards and accessories. Arms and other rests.

School and office furniture.

*B.*—Garden furniture and garden ornaments in wood, bamboo and twig-work.

25TH „ Furniture stuffs, trimmings, galloon-work, &amp;c. Carpets, furniture coverings, tapestry, rugs, alcavates, &amp;c.; waxcloth, canvas, imitation leather, camp-tulikon, corticine, &amp;c.

Blankets, sheets and other bedding.

Mirrors, frame-work and separate parts of same.

26TH „ Chandeliers, candlesticks, lustres, candelabras, lamps, gas ornaments. Separate parts.

Chamber ornaments in bronze.

Garden furniture and garden ornaments, in iron.

Safes. Locksmiths' work.

27TH „ Gold and silver work. Articles of iron, steel, bronze, yellow and red copper, tin, aluminium, nickel and other metals or metal compositions, electro-plate and such like for ornament and domestic use. Cutlery. Pins and needles.

28TH „ Clock-work, pendulums, house barometers, thermometers, &amp;c. Mechanical numerators.

29TH „ Porcelain and crockery. Glass-work, ceramic, terra-cotta, mirror glass, &amp;c.

30TH CLASS.—Apparatuses for heating, cooling and ventilation; filters and separate parts.  
Ice chests.

Furnaces and cooking utensils. Apparatuses for weighing and measuring.  
Weights and measures for domestic use.

Bathing utensils. Washing machines, wringers, mangles, &c.

Ice machines, apparatuses for distillation of water and utilising the sun's heat.

Heat reservoirs, &c.

31ST , , Morocco and other delicate leather-work.

Fancy goods. Toys. Fine brushing work.

Social games. Haberdashery.

32ND , , Stationery and office articles. Drawing and writing requisites. Printing and book-binding. Albums and engravings, photographs, &c. Trade labels, prints, &c. Educational and school requisites.

33RD , , Music and musical instruments, organs, pianos, wind, string and mechanical instruments, &c. Musical boxes, &c.

GROUP V.

*Clothing, Linen and Accessories.*

34TH CLASS.—Twist and tissues of hemp, linen, cotton, silk, wool, rameh, &c.; rugged, bleached, dyed, printed. Filt, &c.

Shawls, wrappers, laces.

35TH , , Ready-made clothes, uniforms, liveries and separate parts, &c. Waterproof clothing.

Body linen, head coverings, gloves, shoes.

Umbrellas and parasols.

Toilet and fancy articles, flowers, feathers, head-dresses, hair.

36TH , , Jewelry and trinkets, precious stones, gold, silver and other personal ornaments.

Imitation and fancy-work fans.

37TH , , Outfits for a residence in the colonies, for out and homeward voyages, &c.

Travelling articles, tents, camp equipage, &c.

Portable weapons. Implements for chase and fishery.

Preciseness instruments for travellers. Travelling and pocket barometers, hygrometers, clinometers, teleometers, pedometers and others. Telescopes, spectacles, eye-glasses and other optical instruments.

GROUP VI.

*Dietary, Chemical Products, and modes of packing them.*

38TH CLASS.—Preserved food, butter and cheese, oleomargarine and other substitutes for butter.

Bread stuffs and articles made thereof.

Cakes and sweetmeats, articles prepared from coffee, cocoa, &c.

Salt, spices, &c.

Drinks in every sort.

39TH , , Cigars and cigarettes, snuff, tobacco, opium, &c.

40TH , , Oil and fat, soap, stearine, parafine, &c. Articles made of them.

Dyes, lacs and varnish.

Spiritual liquids for domestic and industrial use.

Raw materials, specimens, samples of dyeing, bleaching, sizing, tannery, &c.

Prepared caoutchouc, gutta-percha, damar, copal and other gums.

Medicines, mineral waters, chemicals, drugs, matches, perfumery.

Other products of industrial chemistry, and examples of their application.

Gypsum, bone dust and animal charcoal, phosphates, guano, artificial manure.

41ST , , Bottles, cooperage, cork, corking machines and other means of packing and preserving.

Implements and samples.

## GROUP VII.

*Machinery and Implements. Means of Transport.*

42<sup>ND</sup> CLASS.—Engines and other propellers and separate parts.  
 Axles, belting, cylinders, presses, and other general manufactory requisites.  
 Instruments and implements for agricultural purposes.  
 Instruments and implements for industrial purposes, printing-presses, sewing and knitting machines.

43<sup>RD</sup> , , Requisites and apparatuses for physics and chemistry, for spectral analysis, polarisation, saccharimetry, &c.; for meteorology and electricity, and for seismography.  
 Photographical apparatuses and accessories, &c.  
 Requisites for physical research and scientific collections.  
 Surgical instruments and hospital necessaries. Instruments for dentists.  
 Apparatuses for gymnastics, orthopedy, &c.  
 Survey water-level and other instruments of precision and measurement.  
 Manometers. Diagram instruments, calculating machines, &c.  
 Telegraphs, telephones, heliographs, &c.

44<sup>TH</sup> , , Material for railways (stationary and portable), for tramways, transport cables. Separate parts. Models.  
 Carriages and vehicles. Freight and other carts. Separate parts. Models.  
 Articles of saddlery and harness, &c.

45<sup>TH</sup> , , Material and requisites for ocean, coast, and river navigation. Models.  
 Ships' stores, equipments and means of defence and attack in marine warfare.  
 Boat fittings. Tackle and ropework, anchors, chains, &c.  
 Requisites for whaling and cachetot, coral and sponge fishing. Chase and fishery.  
 Nautical instruments, charts, compasses, &c.  
 Lights and signalling. Pilotage. Buoys and beacons. Separate parts. Models. Drawings.  
 Material for wharfs and docks. Models. Drawings.  
 Deep marine soundings, diving apparatuses, life-boats and apparatuses. Separate parts. Models. Drawings.  
 Implements for loading and discharging.

## GROUP VIII.

*Building.*

46<sup>TH</sup> CLASS.—Building materials. Ornaments.  
 Dwellings and annexes. Fabrics, sheds, stables, &c. Models. Drawings.  
 Separate parts.  
 Removable dwellings, ways of joining, binding, &c.  
 Hygienic apparatuses.

47<sup>TH</sup> , , Supplies for public works. Bridges, piers, harbour works, &c. Models. Drawings. Separate parts.  
 Machines for water-supply, water and other wheels, jack-screws, &c.  
 Pumps and pumping machines, centrifugal, Norton's and others.  
 Turbines. Norias. Pulsometers, &c.  
 Appurtenances.  
 Fire-engines and life-saving apparatuses.  
 Implements for irrigation of roads, estates, &c. Models. Drawings.  
 Separate parts.

48<sup>TH</sup> , , Requisites for mining, artesian well-boring, stone quarryings. Covering, lighting of mines.  
 Boring instruments, manipulation of ores, transport, &c. Models. Drawings. Separate parts.

GROUP IX.

*Articles of Export exclusively for the use of the native population.*

49TH CLASS.—Furniture and clothing. Spun, woven and other goods. Ready-made clothes, personal ornaments, praying carpets.

50TH „ Implements and instruments for agricultural and industrial purposes.  
„ Implements and instruments for chase and fishing.

51ST „ Arms and war material.

52ND „ Books, school and writing requisites.

53RD „ Articles of barter (knives, beads, looking-glasses, coins and medals, glass-ware and crockery, images, &c.). Haberdashery.

*General Remarks.*—As the export trade also embraces component parts and loose and spare pieces &c., of the articles of trade, apparatuses, instruments, &c., mentioned, they may likewise be contributed to the Exhibition, even if they are not specially quoted in this programme and will be placed in the class of which they form part.

The same remark applies equally to models, drawings, &c., even when not expressly indicated.

Contributions of books, treatises, statistics, &c., relative to the articles indicated and to the export trade in general, will be highly valued.

AMSTERDAM ; the 15th December 1881.

*The Committee for the Second Section "Export Trade."*

J. LEONARD WOLTERBEEK, LL.D.,  
*Chairman.*

TH. STUART, LL.D., *Secretary.*

*The Central Committee.*

D. CORDES, *President.*

S. DE CLERCQ Wz., *Delegate.*

J. KAPPEYN VAN DE COPPELLO,  
LL.D., *Secretary.*

E. AGOSTINI, *General Commissioner.*

APPLICATION FOR SPACE.

Country \_\_\_\_\_

Section \_\_\_\_\_

Town \_\_\_\_\_

Class \_\_\_\_\_

Name and Address of Exhibitor \_\_\_\_\_

Occupation \_\_\_\_\_

Nature of Exhibits \_\_\_\_\_

Space required in \_\_\_\_\_  
(Vide Tariff No. 1.)

{ Frontage \_\_\_\_\_  
Depth \_\_\_\_\_  
Height \_\_\_\_\_ } (State here the  
form the Exhib-  
bits will take.)

Installation required  
(Vide Tariff No. 2.)

{ \_\_\_\_\_ (Give the corresponding letter from the Tariff.)

Water, Gas, or Steam required \_\_\_\_\_

Name and Address of Exhibitor's representative \_\_\_\_\_

Should my application be received, I hereby agree to accept and conform to the conditions, rules, and tariffs of the *Amsterdam International Exhibition of 1883.*

Signature \_\_\_\_\_

Place and Date \_\_\_\_\_

## TARIFFS.

## No. 1, space.

## In the Principal Building:

Per square metre or frontage	fl. 25.—
For isolated spaces	... „ 50.—

## In the Galleries:

Per square metre	... „ 12.50
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## In the open Air:

Per square metre	... „ 7.50
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## No. 2, Installations.

The Administration of the Exhibition will provide installations, for Exhibitors requiring them, and which they will find ready to receive their particular style or decoration on the space allotted to them.

Installation A	Class case per metre fl 100.—
„	B Open case, cloths, leather, &c. ... „ 85.—
„	C Simple counter ... „ 25.—
„	D Counter with shelves „ 50.—
„	E Ordinary shelves, per square metre ... „ 3.50
„	F Shelves covered with oil cloth per square metre ... „ 5.—

Rent for space or installation is payable in three instalments to order—

*The first instalment one month after the delivery of the certificate of admission.*

*The second instalment four months after the delivery of the certificate of admission.*

*The third instalment on the first of June, 1883.*

NOTE.—As regards India, an endeavour will be made to obtain some modification of these terms.

Should one of these instalments not be paid, the Exhibitor will lose whatever right he may have acquired in the Exhibition. The sums already paid will be considered as damages, and confiscated without any judicial or extra-judicial formality.

## IMPORTANT NOTICE.

*Only the space or installation specified by the Exhibitor in his application will be allotted. Supplementary or subsequent applications will be rigorously rejected.*

ORDER.—Ordered, that a copy of the papers be published in the Supplement to the *Gazette of India* for general information.

E. C. BUCK,  
Secretary to the Government of India.

## GOVERNMENT OF INDIA.

## PUBLIC WORKS DEPARTMENT.

## EXTENDED EMPLOYMENT IN THE INDIAN PUBLIC WORKS DEPARTMENT OF NATIVES OF PURE ASIATIC DESCENT.

No. 1516-28G., dated 11th November 1882.

RESOLUTION—By the Government of India, Public Works Department.

## Read again—

Despatch from the Secretary of State, No. 41, dated 10th August 1876.

„ „ „	No. 20, „ 10th April 1879.
„ „ „	No. 1, „ 8th January 1880.
„ „ „	No. 7, „ 5th February 1880.

## Read also—

Despatch from the Secretary of State, No. 32, dated 17th July 1879.

„ „ „	No. 32, „ 4th August 1881.
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